

VARIABLES OF PERCEPTION IN
SELECTED INDIVIDUALS VIEWING
PROGRESSIVELY ACCURATE
VISUAL STIMULI

By

CORINNE REGINA O'BRIEN

A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA

1968

ACKNOWLEDGMENTS

The writer acknowledges a debt of gratitude to the following persons:

Dr. Myron A. Cunningham, Chairman of the Supervisory Committee, for his inspiration, encouragement, and assistance during her graduate program and during the course of this study.

Dr. Audrey Sims Schumacher, Dr. Charles A. Cate, Dr. James L. Lister, and Dr. Vynce A. Hines, members of the Supervisory Committee, each for his or her own special contribution.

Dr. Cate, Mrs. Betty Jones, and Mrs. Marjorie Williams, University of Florida, for technical assistance in the selection, preparation, and use of some of the testing materials.

Mrs. Nedra Johnson and Mrs. Virginia Kepple, coordinators for A. Quinn Jones School and Alachua County, respectively, during the 1967 Summer Headstart Program; Mrs. Julia Harper, kindergarten teacher at P. K. Yonge Laboratory School; Miss Jane Perry and Mr. Jerre Kennedy, developmental studies professors, Mrs. Rose Frank and Mr. Edward Brunk, psychology professors, Brevard Junior College, for their cooperation and assistance in the scheduling of their students for participation in this research.

Mr. John Jacobs of Gainesville for consultative assistance in the handling of the statistical data.

Dr. Clifford C. Courson, Dean of Student Personnel Services, Brevard Junior College, for encouragement and counsel during the preparation of the manuscript.

Mrs. Shirley Jerome for typing the manuscript.

The 88 persons, age four years to 43 years, who participated in and made this study possible.

Her two children, Lisa Lynn and Brendan Clark, for their patient forbearance and loving support during all of the graduate program.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
LIST OF TABLES.	vi
Chapter	
I INTRODUCTION.	1
Need for the Research	1
Purpose of the Research	3
Plan of the Research.	4
Hypotheses.	5
II DISCUSSION OF CONCEPTS AND RELATED RESEARCH . .	7
Discussion of Concepts.	7
Review of Related Research.	11
Summary of Related Research	16
Assumptions	17
III TESTING INSTRUMENTS AND PROCEDURES.	18
Selection of the Visual Stimuli	18
Definition and Measurement of the Dependent Variables.	19
The Samples	21
Definition of the Independent Variables	22
Determination of Adequate Vision.	27
Description of Special Equipment.	29
Description of the Individual Testing Situation.	30
Statistical Techniques.	33
Summary	34
IV STATISTICAL ANALYSES AND RESULTS.	35
Derivation of Scores.	35
Statistical Analyses.	36
Summary	42

TABLE OF CONTENTS--Continued

	Page
V SUMMARY AND CONCLUSIONS	44
Specific Findings	45
General Conclusions	50
Some Descriptive Data	52
Discussion.	55
Suggested Research.	57
APPENDICES.	60
BIBLIOGRAPHY.	99

LIST OF TABLES

Table		Page
1	AGE DISTRIBUTION: CHILDREN.	23
2	AGE DISTRIBUTION: ADULTS.	23
3	DISTRIBUTION OF PARENTAL OCCUPATION ACCORDING TO D. O. T. AS INDICATIVE OF SOCIOECONOMIC LEVEL.	25
4	ANALYSIS OF LATENCY (L) SCORES.	37
5	ANALYSIS OF MAGNITUDE (M) SCORES.	38
6	ANALYSIS OF PERFORMANCE (P) SCORES.	39
7	LATENCY (L) SCORES IN RELATION TO RESIDUAL VARIABLES	40
8	MAGNITUDE (M) SCORES IN RELATION TO RESIDUAL VARIABLES	41
9	PERFORMANCE (P) SCORES IN RELATION TO RESIDUAL VARIABLES	42
10	MEAN SCORES: GROUPS 1, 2, 3, 4	51

CHAPTER I

INTRODUCTION

Need for the Research

At the time that this study was undertaken, some of the social and economic consequences of the post-atomic era and the "knowledge explosion" had resulted in concerted efforts to improve educational programs. Efforts to improve methods of educating the general populace and to increase the capacity for learning in all persons was deemed essential to the peaceful and productive functioning of a democratic society in an era of technical excellence and automated ancillaries. But while much has been done to effect increased amounts of learning in students, still there exists a great void regarding the very nature of learning. We need an improved understanding of how man learns and perhaps, even more to the point, how he comes by the perceptions which are the building blocks or raw material from which cognitive functions proceed.

Understanding better the nature of perception, would we discover that different persons learn in different ways? Would we discover that all persons learn in the same way, but that, for some, the lack of opportunity or practice had caused distortions or had even created deficiencies? Could

we, by examining perceptual behavior, learn more about the nature of learning, and then train persons to acquire an increased capacity for information and the intelligent use of information?

Gestalt psychology and related forms of perceptual psychology propose that the psychological field of the individual is always organized and that he is "set" to perceive. Some theorists propose that the original categories are innate, that is, that they are genetic in origin, and that all perceptual experience occurs as the end product of increasingly sophisticated techniques of categorization. Other theorists go so far as to say that barring organic deficit, the innate capacity for perceiving is qualitatively and quantitatively the same for all members of a species. It would therefore follow that differences in perceptual functioning in normal persons must be attributed to factors other than the native capacity for perception.

Learning theory suggests that the more meaningful experiences the individual has had, the more ready he is to incorporate new experiences, and to structure and restructure his psychological field in ways which will make the new information more readily available and useful. In other words, the more often one has had an experience, the more easily will he be aware of now having the same experience; and by the same token, the more varied the experiences he has had, the greater will be his opportunity for making fine distinctions, or "differentiating" the experience he is now having.

Children generally have a smaller store of perceptions than have those who have lived a considerably longer time. Persons whose lives have been experientially enriched have a greater store of perceptions than have those who have lived in deprived environments. Children and adults who have been assigned to, or who have voluntarily enrolled in, educational programs designed to strengthen the background for learning, to remediate deficiencies, or to enhance and enlarge necessary skills, might very well demonstrate less facility in perception than would persons in normal educational settings. Hence age, socioeconomic level, and educational setting seemed valid areas of exploration in this research to examine one form of perception, that of the visual channel, and the manner in which "input" is effected for persons who have been designated different from each other in specified ways.

Purpose of the Research

The purpose of this research was to examine perception in subjects who were presumed to represent different degrees of perceptual readiness by reason of differences in (1) age, (2) socioeconomic background, and (3) educational setting. The stimulus for perception was a distorted, but improving, visual image of a commonplace object which the experimental subjects were asked to identify. Three variables were examined: (1) latency, or earliest verbalization of perception; (2) magnitude, or number of modifications of per-

ception; and (3) performance, or length of time required for correct identification of the distorted visual stimulus.

Plan of the Research

A seven-step plan for the study was projected. First, two child-level and two adult-level groups were selected to represent, at each age level, both a normal educational setting and a remedial or potentiating educational setting. Second, a questionnaire was developed to assist in the determination of the probable socioeconomic level of each subject. Third, a method of screening for adequate visual acuity was adopted. Fourth, criteria were established for the selection of culture-fair visual stimuli and the manner in which they would be presented. Fifth, projection, recording and decoding techniques were adopted. Sixth, the visual stimuli were presented in an individual testing session to each member of the four selected groups. Seventh, all data resulting from testing and questionnaires were tabulated and subjected to statistical analysis.

Hypotheses

Several hypotheses were developed in order to aid in exploration of the problem. The hypotheses fell into two classifications, as follows:

Major hypotheses:

- (1) Children will exhibit later latency than will adults in attempting to identify a distorted image of a commonplace object.

- (2) Persons from lower socioeconomic levels will exhibit later latency than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.
- (3) Persons in readiness or remedial educational settings will exhibit later latency than will persons in normal educational settings in attempting to identify a distorted image of a commonplace object.
- (4) Children will have lower magnitude scores than will adults in attempting to identify a distorted image of a commonplace object.
- (5) Persons from lower socioeconomic levels will have lower magnitude scores than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.
- (6) Persons from readiness or remedial educational settings will have lower magnitude scores than will persons from normal educational settings in attempting to identify a distorted image of a commonplace object.
- (7) Children will require a longer time for correct performance than will adults in attempting to identify a distorted image of a commonplace object.
- (8) Persons from lower socioeconomic levels will require a longer time for correct performance than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.
- (9) Persons from remedial or readiness educational settings will require a longer time for correct performance than will persons from normal educational settings in attempting to identify a distorted image of a commonplace object.

Residual data and null hypotheses. Because variables other than age, socioeconomic level, and educational setting might profitably be examined for their relationship to the facets of perception being considered here, data such as race, sex, number of siblings, visual orientation, and intellectual ability were included in the statistical analysis. Further, because there was no published research of a similar nature, nor any bases for formulation of hypotheses, the writer presumed the null hypothesis for all remaining independent variables.

CHAPTER II

DISCUSSION OF CONCEPTS AND RELATED RESEARCH

Discussion of Concepts

The question might rightly be raised as to why the present study employed age, socioeconomic level, and educational setting as the major independent variables rather than, for example, high intellectual and low intellectual functioning as evidenced by high IQ or low IQ scores. Would not the individual with a high IQ perceive more swiftly and accurately than would the individual with a low IQ? Does one perceive well because he is more intelligent, or does one become more intelligent because he has perceived well? This is still a moot question, reminiscent of the chicken and the egg. But research must begin somewhere, and the writer concluded that the more useful information could be obtained by examining groups that could be determined positively and objectively to differ in variables that denote different levels and kinds of experiences. The research of Spitz (1946), Harlow (1949), Boger (1952), and Goldfarb (1955), indicated the importance of sensory and perceptual stimulation in the development of intelligence. Studies in the sensory deprivation of persons in isolation chambers (Schultz, 1965) noted the breakdown of psychological

processes and the deterioration of intellectual functioning as a concomitant of the deprived environment. Summer enrichment programs, Operation Headstart, the cultural enrichment programs of Florida Sunland Training Centers and of Job Corps Centers are all predicated on the assumption that many and varied sensory experiences contribute to intellectual growth and development. The hypotheses for this study are predicated on similar assumptions.

The cognitive event and its externalization. The three variables of perception to be examined in this study were treated as cognitive functions. It must be conceded that affective, physiological, and motivational states can and do operate in all such behavior. Appropriateness of response and correct-performance time seem clearly related to measures of good categorization. Latency, however, may be related to such diametrically opposed personality traits as passivity, defensiveness, and lack of a plan or schema, on the one hand, to self-confidence, freedom from pressure, and ability to tolerate ambiguity, on the other hand (Bruner, et al., 1956). Magnitude may be related to habits of field-dependence or field-independence (Witkin, 1954), or to habits of convergent or divergent thinking (Guilford, 1967¹); but in the absence of contrary evidence, the writer feels justified in hypothesizing that such habits hinge upon earlier methods of storage in and retrieval from memory and, as such, are as closely related to cognitive functions as they are to personality factors. In this study, magnitude did not imply

volubility (twinning or redundance), but rather, fluency of thought (relatedness). Whatever the affective or motivational influences operating in the present study, the very nature of the increasingly structured visual clues provoked cognitive activity. At some point the stimulus precipitated a perception¹ in much the same way that pepper elicits a sneeze. That the internal intellectual response was not as immediately demonstrable as the sneeze is a hazard and shortcoming of all testing procedures which require a voluntary externalization or signal from the subject.

Definition of perception. For the purpose of this study, perception was defined as the cerebral interpretation at a conscious level of an external stimulus. It denoted a mental event that was verbalized by the subject.

Contrived nature of the stimulus. Several theoretical models of sensori-perceptual functioning will be discussed in the review of related research. Each of these theories offers a plausible account of what happens internally when a subject perceives; but, because perception is an internal response not now completely identifiable and measurable, the theories rest on the subject's overt responses to stimuli. Perceptual responses occur with such lightning speed that it is only when the subject is struggling with a response, and groping for labels to stimuli or solutions to

¹Because the stimulus was distorted, the subject was required to impose his own structure or to conceptualize. For this reason perception, as used in this study, might more accurately be thought of as perceptualization.

problems, that one may glean something about the nature of internal processes. The writer does not pretend, in the absence of any current technique for examining the swift perceptual response in slow-motion, that the presentation of a slow-motion stimulus will produce the same effects. In other words, no effort is being made here to equate an absolute response to a slow-motion stimulus on the one hand, with a hypothetical slow-motion response to an absolute stimulus on the other hand. Rather, the writer believes that in the present study, at any given second, the distorted stimulus is, of and in itself, an absolute stimulus to which the viewer is making a new and adjustive response. That he may in fact not do so; that he may become stimulus-bound, is an interesting possibility.

In summary, the visual stimuli employed in this study were admittedly contrived stimuli. They were intended to inhibit the subject's ability to categorize an image, in order to observe how he would utilize additional or improved information in his efforts to perceive accurately.

Review of Related Research

The organic and neurophysiological basis for perception in lower animals and in man has been the object of clinical research by Pavlov (1906), Sherrington (1906), Hebb (1949), and Penfield (1954). Each demonstrated that perception is a localized cerebral experience. The experience might be "irradiated" as Pavlov stated, or might represent electrical

phenomena as Sherrington, Hebb, and Penfield have proposed, but in any case, science has dissipated some of the mystery surrounding perception and has reduced it, more or less, to a something real which occurs at a tissue level. Ittleson (1954, 1960) proposed that the ability to perceive is acquired or learned; Schiller (1952) and Pastore (1960) suggested that such ability is innate, implying that it is only the inhibition of that capacity which may be acquired or learned.

The developmental and maturational aspects of perception were emphasized by Getzels and Elkins (1964) and by Piaget (1926, 1958, 1960). Hunt (1961) proposed that maturation is the result of interaction between the "physiology" and the "experience," and that it is more likely that experience, rather than physiology, impedes a child's development.

Perceptual psychology and phenomenology place varying degrees of emphasis upon the personality structure of the perceiver. That emotional sets exist in subjects so that they will perceive in accordance with their need, expectancies or values has been noted by Lecky (1945), Kelley (1947), Ittleson (1954), Engel (1956), and Combs and Snygg (1959).

The operation of culturally determined perceptual set was demonstrated by Engel (1956). His experiment showed that subjects viewing two different pictures in a binocular device perceived only the more familiar of the two; that is, they resolved conflicting stimuli in favor of the stimulus to which they were more accustomed.

That the perceiver perceives in accordance with the quality and quantity of his past perceptions and in accordance with the internal reorganization of these stored perceptions is an area of agreement for educational psychologists. Harlow (1949), Skinner (1957), Mowrer (1960), and Sokolov (1963) regarded perception as the trial-and-test scanning of stored responses that have been learned in the presence of appropriate stimuli. In other words, the perceiver must test the present experience for similarities and differences in relation to past experience. Tolman (1948), Ryle (1949), Bruner (1947), Miller, Galanter, and Pribram (1960), and Soltis (1966) propose that perception occurs according to the perceiver's "cognitive maps," "perception recipes,"¹ or schema of the world. In other words, the perceiver, by reason of his past experiences, brings a set of expectancies to his most recent perceptions.

It would be an oversimplification to say that behaviorism places emphasis on the perceived and that cognitive theory places emphasis on the perceiver; nonetheless, such emphasis exists among a few writers. Ittleson (1954) explained perception as a transactional phenomenon which must take into account the total situation and the equally important role of both the perceiver and the perceived.

It is interesting to note that one of the earliest observations on similarities between the operations of

¹The operation of a stereotype is an example of a "perception recipe."

information processing and human thought processes was made by Piaget (1953). Wiener (1954, 1964), Wooldridge (1963), Smith (1966), and Newell, Simon, and Shaw (1965) have also made analogies between the automatic control system formed by the nervous system and brain and by mechanical-electrical communication systems. Bad programming has resulted in the trade expression, "Garbage in--garbage out." In other words, even the wonderful "brain machine" can "perceive" only in accordance with the quality of its total "experiences." It can perform only as efficiently as its informational input and behavioral programming will allow.

Research most pertinent to the present study. , The present study is related to the work of Archer (1965), Bruner (1957), Bruner and Potter (1964), Ryle (1949), and Frymier (1957).

Archer (1965) experimented with concept identification as a function of the obviousness of relevant and irrelevant information. In that study, Archer back-projected visual stimuli onto a rear-view screen and tachistoscopically controlled exposure time. A total of 128 university students (64 men and 64 women) were instructed to assign to one of four categories the visual projection of various geometric figures. These figures were designed to differ in size, number, color, shade, horizontality, form, and the presence or absence of a dot. Archer noted that the best performance occurred when the obviousness of relevant information was

maximized and the obviousness of irrelevant information was minimized. Archer also noted some sex differences. He hypothesized post hoc that when form was relevant and the female lacked appropriate vocabulary (e.g., described a trapezoid as a "nonsquare" or "tippy square"), she performed poorly in comparison with the male. This impairment of performance, associated with lack of vocabulary, is of special interest in the present study.

Frymier (1957) analyzed the check-list choices of 91 high school students from rural Alabama and 64 high school students from urban Michigan in their responses to aural stimuli presented by tape-recorder. He related free choices and test-and-retest choices to geographical setting and scores on authoritarianism. Rural subjects identified ambiguous sounds as related to animals or machinery and urban subjects identified the same sounds as related to people or to city noises. Frymier concluded that the subjects' choices were a function of personality and of culturally-induced perceptual set.

Ryle (1949) proposed that a visual sensation is not experience per se, but occurs in a specific frame of mind, and that the subject exercises an acquired skill of applying a "perception recipe" at the same time that he is experiencing the sensation.

Bruner (1957) held that no sensation can be had raw, that is, apart from a simultaneous act of categorization. In other words, one could not have a visual sensation apart

from at least the basic categorization of "thinginess." As one developed refinements of the qualities possessed by these things, it would follow that multiple categories and sub-categories would become available to the individual for his later perceptions of similar or dissimilar "things."

Experiments employing changing visual stimuli were conducted by Bruner (Weil, 1964) in order to demonstrate his theories on perceptual readiness. Bruner is reported as having become stimulus-bound, elaborating upon a changing stimulus and structuring it to be a painting by Renoir depicting a young girl at the opera. When the picture came into full focus, it represented Bruner's own bicycle rack at Harvard University. Bruner reported that he sat observing the fully focused picture for another forty seconds, perplexedly attempting to revise his perception. This was an informal self-experiment.

Bruner and Potter (1964) reported a study using a variable-speed motor to control excursions of the lens barrel in projections of a changing visual stimulus. Thirteen students served as the standardization group in the determination of four degrees of acuity, the highest degree of acuity being the point at which one-fourth of the sample had correctly identified the image. The experimenters then tested 89 university students, beginning the visual stimulus at different degrees of blurredness and moving toward focus. They also tested for the other direction; that is, from the highest degree of acuity to changes in the blurred

direction. Perhaps the most pertinent finding was that subjects viewing visual stimuli moving into the degree of acuity which permitted identification for one-fourth of the standardization group performed less well than did those subjects viewing stimuli moving in the other direction, that is, from nearly focused to out-of-focus.

The present study represented a departure from, but an extension of, Bruner's work, first, by reason of examining measures of perception other than correct performance; and secondly, by reason of the selection of differentiated subjects. So far as can be determined from the current literature, this study was the first of its kind in analyzing for a number of perceptual variables and in examining for differences of response in different groups of subjects. It is thought by the writer to be the first comparative study of visual-clue utilization in a changing stimulus by viewers presumed to represent differences in perceptual readiness as evidenced by differences in age, socioeconomic level, and educational setting.

Summary of Related Research

The literature in the field indicated that, first, although there existed a proliferation of scholarly works on perception, most of these were devoted to the proposal of theories or to definitive models of perception. Second, three main orientations in psychology were represented in the current literature: behavioral, cognitive, and trans-

actional. Analogies with cybernetic science had been made for all three. Third, excepting for the area of severe mental retardation, there was a paucity of literature reporting the application of principles of perception to elementary education programs or educational remediation and retraining for normal adults.

This study was intended to enlarge and extend the study of Bruner and Potter (1964). It was supposed that whether or not the results demonstrated differences among the four groups of viewers, such results would nonetheless demonstrate some differences among individuals and that a further pursuit of the reasons for these differences would contribute to an increased understanding of the phenomena of perception and conceptualization. The study was made in the interest of perceptual theory and of learning theory in general.

Assumptions

This study assumed that early latency, high magnitude, and early performance are more desirable qualities of perceptual functioning than are their opposites.

CHAPTER III

TESTING INSTRUMENTS AND PROCEDURES

Selection of the Visual Stimuli

In order to insure that the subjects being tested would have access to an identifying label for the object being viewed, one criterion of selection was that the object be either culture-free, i.e., some common animal, vegetable, or mineral substance in a natural and unchanged state, or culture-fair, i.e., some manmade product that was nevertheless sufficiently common that all persons would have had some exposure to it. Under the direction of the Educational Media Center, University of Florida, the writer took some thirty 35 mm. colored pictures, meeting the culture-free, culture-fair criterion. These were reviewed by several committee members and members of the educational media staff. The final ten selections were based on further criteria of clarity, content, and likelihood of facilitating response. Pictures of a tree and of the body of a man were deliberately cropped in order to impede their identification and to make them more nearly as difficult to identify as were the other images. Content of the pictures was as follows:

1. Tree
2. Mail truck
3. Flowers
4. Ice cube tray
5. Rocks
6. Silverware
7. Man
8. Ashtray
9. Dishes
10. Superman¹

Exploratory study. Over a period of several months, the writer, her chairman, and members of the Educational Media Center experimented with various pictorial distortions. Although there occurred frequent and amusing misidentifications, neither they nor the writer's primary school children had the experience of becoming stimulus-bound. It was therefore concluded that Bruner's experience was an unusual one, and need not be considered in the formulation of hypotheses. No formal pilot study was attempted because of the difficulty in replicating four such groups for a second study.

Definition and Measurement of the Dependent Variables

Latency. For the purpose of this study, latency was a response measurement determined by the subject's first

¹Reproductions may be found in Appendix B.

verbalization regarding the nature of the visual stimulus. It was used as an indicator of facility or speed of perceptual response. If the subject said without pause, "It's a dog," the response was tabulated as having occurred from the first utterance, "It's . . ." If the subject said, "It's a . . . uh . . . uh . . . dog," perception was regarded as having occurred with the word dog.

Magnitude. For the purpose of this study, magnitude was a response measurement determined by the number of differing responses regarding the nature of the visual stimulus. It was used as a measure of facility in revising one's perceptions to fit the changing visual clues. "It's a tree . . . yes, I still see a tree," constituted a single response. "It's a tree . . . an anchor . . . a tree," constituted three separate responses by reason of the intervening perception. Particular identifications and generic ones, in either direction, were counted separately as indicating refinements of categorization. Thus, "It's a human being . . . a young boy." and "It's a knife, fork, and spoon . . . it's silverware," would each represent two separate categorizations.

Performance. For the purpose of this study, performance was a response measurement determined by the length of time that expired between the onset of the stimulus and the subject's verbalization of a correct identification¹ of the

¹No provision was made for the occurrence of a standard identification in the finished performance, but a few of these did occur and are noted in Appendix C.

projected image. It was intended as a measure of speed in the effective use of visual clues for the correct categorization of a distorted image. In the response, "It's a tree . . . an anchor . . . a tree," performance time was recorded for the second verbalization of tree. For "It's a tree . . . still a tree," performance time was recorded at the first verbalization of tree.

The Samples

Effort was made to insure a maximum of differences within a given age level in order to increase the validity of differences between child and adult levels, should these be demonstrated by the testing results. To investigate the possibility of differences in perception as a function of differences in age, socioeconomic condition, and educational setting, four groups were selected as follows:

Group 1. A predominantly Negro coeducational pre-primary class enrolled in a federally supported summer enrichment program entitled Operation Headstart, for which one criterion of eligibility was financial disadvantage.

Group 2. A predominantly white coeducational pre-primary class enrolled in a summer enrichment program at the laboratory school, University of Florida.

Group 3. A predominantly white coeducational group of second-semester students representing the enrollment of four classes in a remediation non credit reading course at Brevard Junior College, a community school which had an open-door

admissions policy, low tuition requirements, and a wide program of financial aid for the disadvantaged.

Group 4. A predominantly white coeducational group composed of two classes in psychology required, respectively, for the Associate of Science or technical degree and the Associate of Arts or college-parallel degree at the same community junior college.

Of the 88 students who were individually tested, 84 were reported in the final sample. One subject was dropped from Group 2 because of a testing error; two subjects were dropped from Group 3, one because she was a Brazilian national with English language deficiencies and the other because she had failed to wear her prescription glasses during the testing session. One student in Group 4 was omitted because of a testing error. The final sample consisted of 22 children and 62 adults, representing two different types of educational setting, two different socioeconomic levels, and several incidental variables, all of which are defined below.

Definition of the Independent Variables

Age. For the purpose of statistical analysis, there were two classifications: (1) child, and (2) adult. More specifically, the distribution of ages is described in Tables 1 and 2:

TABLE 1
AGE DISTRIBUTION: CHILDREN

	4½ yrs.- under 5	5 yrs. - under 5½	5½ yrs.- under 6	6 yrs. - under 6½	6½ yrs.- under 7
Number of Subjects- GROUP 1	3	2	2	2	1
Number of Subjects- GROUP 2	5	4	3		

$\bar{X}_1 = 5 \text{ yrs.}, 5 \text{ mos.}$

$\bar{X}_2 = 5 \text{ yrs.}, 0 \text{ mos.}$

TABLE 2
AGE DISTRIBUTION: ADULTS

	18-21	22-25	26-29	30-33	34-37	38-41	42-45
Number of Subjects- GROUP 3	19	4	2	1			
Number of Subjects- GROUP 4	17	7	4	4	2		2

$\bar{X}_3 = 21 \text{ yrs.}, 1 \text{ mo.}$

$\bar{X}_4 = 24 \text{ yrs.}, 4 \text{ mos.}$

Socioeconomic level. For the purpose of statistical analysis, there were two classifications: (1) low, and (2) high. Classification was made on the basis of the occupational level of one or both parents, the higher level being the determining factor. More specifically, all ten subjects in Group 1 were classified as low; ten subjects were classified high and two were classified low in Group 2. Fifteen subjects were classified high and 17 were classified as low in Group 3. Fifteen members in Group 4 were classified as low, 21 members were classified as high. The preponderance of high socioeconomic classifications in Group 4 may be attributed in part to the fact that the junior-college student body was drawn from the Cape Kennedy area where the educational level of the adult population is one of the highest in the nation because of a concentration of scientists, engineers, and technologists. The Dictionary of Occupational Titles¹ was used as the authority for classification. All occupations listed at the 000 or 100 level (i.e., the professional, technical, and managerial occupations) were deemed representative of high socioeconomic level. Jobs listed at the 200 through 900 level were deemed to represent lower socioeconomic level. The distribution of occupational levels is described in Table 3 following:

¹U. S. Department of Labor. Dictionary of Occupational Titles. (3rd ed.) Washington, D. C.: U. S. Printing Office, 1965.

TABLE 3

DISTRIBUTION OF PARENTAL OCCUPATION ACCORDING TO D. O. T.¹
AS INDICATIVE OF SOCIOECONOMIC LEVEL

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
0 Professional, technical 1 and managerial		12	15	24
2 Clerical and sales		2	4	6
3 Service	9		6	4
4 Farming, fishery, forestry and related	1		1	1
5 Processing	2			
6 Machine trades			4	4
7 Bench work				3
8 Structural work			1	1
9 Miscellaneous	1	1	1	2

¹Dictionary of Occupational Titles.

It must be conceded that in some instances a laborer may be the head of a household that encourages education, aesthetics, and enriching social and cultural experiences for the family; contrariwise, a professional person may head a family in which education and finer values are not esteemed. Still, the presumption must be that social advantages and cultural opportunities are more readily available to those families in which a high level of education, a recognized profession, and commensurate financial income exist. The

occupational titles of the heads of households constituted the best objective indicator of socioeconomic status available for this study.

Educational setting. For the purpose of statistical analysis, there were two classifications: (1) remedial or readiness, and (2) normal. Child subjects from Operation Headstart and adult subjects in developmental studies reading classes were deemed to be in remedial or readiness settings. Child subjects at the laboratory school and adult subjects in degree programs at the Junior college were deemed to be in normal settings.

Race. For the purpose of statistical analysis, there were two classifications: (1) Negro, and (2) Caucasian.

Sex. The classifications were: (1) female, and (2) male.

Sibling quotient. For the purpose of statistical analysis, there were two classifications: (1) low, and (2) high. Subjects who had two or fewer siblings (or none) were classified low. Subjects who had three or more siblings were classified high. A sibling was defined as a brother, a sister, a step-brother, a step-sister, a half-brother, or a half-sister who resided in the home with the subject before or during his primary school enrollment.

Visual quotient. These scores were available for adult subjects only. The subject was asked to estimate his involvement as a child in certain pastimes which required visual orientation. Score values were assigned for the degree to which he reported having been interested in these

activities.¹ For the purpose of statistical analysis, there were two classifications: (1) low, and (2) high.

Ability quotient. These scores were available only for adult subjects who had resided in Florida during their senior year in high school and who had participated in the Florida Statewide Twelfth Grade Placement Tests.² According to the publishers, the first test in this battery was derived from the once prevalent American College Entrance Examination (A. C. E. - Psychological) and was a measure of intelligence or scholastic aptitude. Scores were reported in percentile ranks. For the purpose of statistical analysis, there were two classifications: (1) low, and (2) high. Scores from 0%-ile to 49%-ile were classified as low; scores from 50%-ile to 99%-ile were classified as high.³

Determination of Adequate Vision

All adult subjects admitted to testing had had eye examination within the immediate past year as part of the health examination required for admission to the junior college. In Group 3, there were five subjects who used reading glasses, two subjects diagnosed as nearsighted and corrected with lenses to adequate vision, and two subjects with "slight astigmatism" corrected by lenses. In Group 4,

¹A copy of this portion of the questionnaire and the scoring procedure may be found in Appendix A.

²Published by Educational Testing Service, Princeton, New Jersey and administered annually to all Florida high school seniors.

³Percentile scores based on Florida norms.

there were five subjects who used reading glasses, seven subjects diagnosed as nearsighted and corrected with lenses to adequate vision, and one subject with astigmatism corrected by contact lenses.

Although all members of Operation Headstart had had professional optical examinations as part of the health services provided in that program, medical records were not available to the writer. A modification of the Snellen Eye Chart Examination was therefore adopted as a testing instrument to be administered to all child subjects. A series of four cards, black-on-white, each bearing the character E in sizes ranging from three inches to one-fourth inch were shown to each subject individually at respective distances of twenty, ten, five, and two and a half feet. The first three cards were intended to put the child at ease and familiarize him with the response of holding his first, second, and third fingers in the same directional pattern as the E (correct, reversed, bar-side up, bar-side down). The criterion for adequate visual acuity was the ability to distinguish the direction of a one-fourth inch character at a distance of two and a half feet. This was the same distance at which the subject would later be tested with the distorted visual stimuli. All child subjects successfully passed this screening device. It must be remarked, however, that the test would not have detected visual defects such as astigmatism.

Description of Special Equipment

Kodak-Carousel: 800. The ten 35 mm. colored slides which had been selected for this experiment were used in a Kodak-Carousel, Model 800, slide-projector. This device was electrically powered, had a carousel-type slide tray and an extension attachment with two buttons which allowed the operator to control both the progression of slides and the excursion of the lens barrel for proper focusing. The Kodak-Carousel:800 was stationed approximately two and a half feet from the projection screen, to the left of the viewer, in such a manner and at such a distance that, by steady depression of the focus button, the operator could cause the out-of-focus picture to move at constant speed into full focus in a period of 14 seconds. Separate projectors were used for the testing of children and the testing of adults. Each was the Kodak-Carousel:800 and each device was pretested to determine that the excursion time for focusing was exactly the same for both devices.

Capstan-driven tape recorder. A capstan-driven electrically-powered tape recorder, a Crown-corder, Model CTR-5400, was used for recording in all four testing settings. The volume and tone control were adjusted to the recording needs of each individual subject and the speed control (3 3/4 i. p. s.) was the same in all situations. This equipment allowed the experimenter to record an identification of each subject at the beginning of his session and to note the onset of each new stimulus with a recorded signal. There

was also recorded a clicking signal emitted by the Kodak-Carousel:800 when the lens barrel was at full extension with the picture in full focus. The subject's responses to all ten presentations were thus accurately preserved for later examination and evaluation when a stop-watch analysis and itemization of content was done from the tapes.

Stop watch. A Stratho, seven-jewel, Swiss movement, 30 minute stop watch with one-fifth-second intervals was employed during analysis of the tapes for the timing of latency and performance.

Description of the Individual Testing Situation

The testing room. The child groups were tested in their respective schools in rooms especially curtained or screened for the projection of films. Adult groups were tested in a similarly darkened room at the junior college. All such rooms were sufficiently dark, adequately aired, and removed from sources of distraction.

Notice. All subjects had advance notice from teachers that they would be asked to participate in the testing on a certain day.

Testing children. Child subjects were individually escorted by an assistant from the classroom to the testing room when it was time for them to be tested. The tester greeted a child by name and not only discussed what was going to happen, but also demonstrated with an eleventh slide which was carried in the Kodak-Carousel in advance of the ten testing slides. In order to avoid any artificial

tone in the interview, the instructions to children were not memorized or given verbatim. Instead, the tester had two goals: (1) to establish rapport, and (2) to reassure the child and herself that instructions were completely understood. Each group was tested on separate July mornings after classes had been in session for about three weeks.

Testing adults. Adult subjects were informed by their teachers that they would be asked to participate in a research project that would require about fifteen minutes of their time.¹ The remedial reading classes were scheduled for testing during their regular class time. Students from the psychology classes scheduled themselves into fifteen-minute slots that fit their schedules. An area adjoining the testing room was used as a waiting room where each student completed a questionnaire before being admitted to testing. In the testing room, the student was greeted by name and he exchanged his questionnaire for a sheet of instructions.² This arrangement allowed the tester to seek any further information or details directly from the student and to make additional notes at that time on the subject's questionnaire form. The subject was invited to ask questions

¹The writer requested that a minimum of advance information be given these adult students so that they would be fairly naive subjects at the time of testing. As a gesture of appreciation, she agreed to be a guest lecturer in each class later in the term to discuss the theoretical background and purpose of the testing.

²A copy of the questionnaire and the instruction sheet may be found in Appendix A.

regarding the instructions. Adult subjects were tested morning and afternoon during two full days in early April, about two weeks before the end of the second term of their enrollment.

General testing conditions. Each individual subject was seated in a regular classroom chair approximately two and a half feet from a finely-beaded projection screen. To the subject's left was an 18-inch wide two-shelf projection table on casters. The Kodak-Carousel occupied the top shelf. The capstan tape recorder was on the second shelf and the microphone extension was placed to the rear of the projector with the microphone head on a line with, and directed toward, the subject. This placement was adopted so as to allow the subject complete bodily freedom and to remove from his line of vision those pieces of equipment which might distract him or preserve for him the impression of a testing situation. After the machine was adjusted for tone and volume to insure clear recordings of the subject's voice, the lights were extinguished and the tester took a seat on the other side of the projection table where all controls to the two machines were readily accessible. The subject's identification number was recorded by the tester and the subject's verbalizations were similarly recorded on magnetic tape during the subsequent showing of the slides. The tester spoke during the actual testing only to answer a routine question or to try to elicit identifications in the

case of two children and two adults.¹ No effort was made to elicit improved responses in the case of the few substandard performances,² but the picture was continued in focus several seconds longer in order to ascertain that the subject had given his best and last performance. At the conclusion of testing, subjects were allowed to react to the experience if they needed to, and in a few instances the tester asked additional information for the questionnaire.³ Each subject was thanked for participating in the experiment and was ushered out the door where the next subject was met and the process repeated.

Statistical Techniques

For each of the subjects, the following scores were calculated using the procedures described above: latency (L), magnitude (M), performance (P), age, socioeconomic level, educational setting, race, sex, and sibling quotient. For adult subjects, visual quotient and ability quotient were also recorded.

Testing the differences. A statistical comparison of the differences in perceptual behaviors between and among specified groups was made by a series of t tests.

¹These events are related in Chapter V under the heading Some Descriptive Data.

²An incomplete or inferior label was deemed a "sub-standard performance."

³Additional questions were asked if the subject's performance had demonstrated any unusual set or pattern. There is further explanation and examples of these cases in Chapter V under the heading Some Descriptive Data.

Determining statistical significance. Throughout the rest of this study, the writer has considered a level of significance of .05 as statistically significant.

Summary

After developing a test to measure variables in a person's perception of distorted visual stimuli and establishing variables of age, socioeconomic level, and educational setting, together with other incidental differences in the subjects to be tested, the writer individually tested 84 subjects for each of whom a number of scores were calculated and submitted to statistical analysis. The results of the statistical analysis of these data are reported in Chapter IV.

CHAPTER IV

STATISTICAL ANALYSES AND RESULTS

Derivation of Scores

The purpose of this study was to examine whether significant differences in variables of perception would be demonstrated by groups of persons differing in (1) age, (2) socioeconomic level, and (3) educational setting. After having recorded on magnetic tape the verbalizations of 22 children and 62 adults who were requested to "think out loud" in their efforts to identify a distorted visual stimulus, the tester subjected the tapes to a stop-watch analysis and itemization of content in the following manner:

First, each subject was identified by a code number and his tape was played through so that the tester could make a written record of the responses made to each slide.¹ The total number of verbalizations which represented separate perceptions or changes of perception, as described in Chapter III, constituted the subject's magnitude (M) score.

Second, the subject's tape was replayed and the tester employed a one-fifth-second interval stop watch in order to record the time which elapsed between (1) the recorded signal

¹A complete listing of verbalizations by each individual subject may be found in Appendix C.

denoting the onset of the stimulus and (2) the initial verbalization for each slide. The time of the initial verbalization for each of the 10 slides was recorded in whole numbers and decimals representing seconds elapsed. These 10 scores were averaged for each subject and the resulting figure constituted the subject's latency (L) score.

Third, the tape was played a third time, and the tester recorded, for each of the subject's 10 trials, the time which elapsed between the onset of the stimulus and the subject's verbalization of a correct, or at least final, identification of the stimulus. The average of these 10 performances constituted the subject's performance (P) score.

In this way, each subject's performance on the test was repeated for the tester at least three times. The subject's tape could be replayed as many times as were necessary for the computation of his latency, magnitude, and performance scores.

Statistical Analyses

Having entered the subject's code number and his L, M, and P scores on separate 3" by 5" index cards, the tester then coded each card for the subject's classification in regard to (1) age, (2) socioeconomic level, and (3) educational setting. Other characteristics of the subject, previously defined as residual data, were also coded on each card. The cards facilitated the reorganization of data for specific groups under consideration.

Having adopted a .05 level of significance and having hypothesized a direction for the three dependent variables (L, M, P) in relation to the three independent variables (age, socioeconomic level, and educational setting), the writer examined the nine hypotheses of this study, by subjecting the data to nine successive one-tailed t-tests, the results of which are set forth in Tables 4, 5, and 6.

TABLE 4
ANALYSIS OF LATENCY (L) SCORES

	\bar{X}	N	SS	VAR.	t
Child vs Adult	14.75 6.11	22 62	286.81 671.34	13.66 11.01	10.19***
Low Socio- Economic vs High Socio- Economic	9.17 7.50	38 46	1021.61 1200.39	27.61 26.68	1.46
Remedial Setting vs Normal Setting	10.09 6.82	37 47	715.13 1335.24	19.86 29.03	2.97***

*** $p < .001$, one-tailed test

Latency. The L score was a response measurement representing an average of time expressed in seconds. Early latency was defined in this study as a desirable perceptual behavior and therefore a low score indicated a superior per-

formance. The L scores for children as opposed to adults, and also for subjects in remedial settings as opposed to those in normal settings, differed significantly. Although subjects from low socioeconomic levels as opposed to high socioeconomic levels demonstrated later latency, as predicted, the difference was not significant. These results are presented in Table 4.

TABLE 5
ANALYSIS OF MAGNITUDE (M) SCORES

	\bar{X}	N	SS	VAR.	t
Child vs Adult	13.95 27.48	22 62	220.90 1777.13	10.52 29.13	13.90***
Low Socio- Economic vs High Socio- Economic	22.13 25.43	38 46	3217.29 4710.54	86.95 104.68	1.64
Remedial Setting vs Normal Setting	20.27 26.83	37 47	2105.86 5050.22	58.49 109.79	3.32***

*** $p < .001$, one-tailed test

Magnitude. The M score was a response measurement representing the average number of separate perceptions, and a high score represented a superior performance. All groups performed in the directions predicted, but the difference

between M scores for subjects from low socioeconomic levels as opposed to those from higher socioeconomic levels was not significant at the .05 level. These results are presented in Table 5.

Performance. The P score was a response measurement representing an average of time expressed in seconds. Early performance was defined in this study as a desirable perceptual behavior, and therefore a low score constituted a superior performance. All groups performed in the directions predicted, but the difference between P scores for the subjects from low socioeconomic levels as opposed to those from high socioeconomic levels, and also for subjects from remedial settings as opposed to normal settings were not significant at the .05 level. These results are presented in Table 6.

TABLE 6
ANALYSIS OF PERFORMANCE (P) SCORES

	\bar{X}	N	SS	VAR	t
Child vs Adult	18.40	22	77.27	3.68	10.94***
Low Socio- Economic vs High Socio- Economic	13.55	62	110.98	1.82	
Low Socio- Economic vs High Socio- Economic	15.29	38	243.73	6.32	1.56
High Socio- Economic vs Remedial Setting	14.43	46	276.45	6.14	
Remedial Setting vs Normal Setting	15.33	37	200.72	5.58	1.56
Normal Setting	14.42	47	405.13	8.81	

*** $p < .001$, One-tailed test

Next, null hypotheses for the residual data were examined by two-tailed t tests. The results are reported in Tables 7, 8, and 9.

TABLE 7
LATENCY (L) SCORES IN RELATION TO RESIDUAL VARIABLES

	\bar{X}	N	SS	VAR.	t
Negro vs Caucasian	14.62 6.98	14 70	138.61 1442.86	10.66 20.91	7.49***
Female vs Male	8.39 8.18	30 54	965.73 1266.72	33.30 23.90	.177
Low Sibling Q. vs High Sibling Q.	8.29 7.95	50 34	1455.76 756.24	29.71 22.92	.296
Low Visual Q. vs High Visual Q.	6.08 5.98	33 29	372.39 299.77	11.64 10.71	.120
Low Ability Q. vs High Ability Q.	7.06 5.46	18 16	214.47 218.88	12.62 14.59	1.30

*** $p < .001$, two-tailed test

There was a significant difference in L scores for Negro as opposed to Caucasian subjects. Other contrasting variables showed no significant difference as illustrated in Table 7.

TABLE 8
MAGNITUDE (M) SCORES IN RELATION TO RESIDUAL VARIABLES

	\bar{X}	N	SS	VAR.	t
Negro vs Caucasian	13.99 25.94	14 70	122.72 6370.61	9.44 92.33	8.47***
Female vs Male	24.30 23.74	30 54	3601.16 4294.90	124.18 81.04	.251
Low Sibling Q. vs High Sibling Q.	24.04 23.79	50 34	5251.50 2637.66	107.17 79.93	.115
Low Visual Q. vs High Visual Q.	27.00 28.03	33 29	2290.00 2787.71	71.56 99.56	.448
Low Ability Q. vs High Ability Q.	25.33 28.06	18 16	1203.14 1046.80	70.77 69.79	1.02

*** $p < .001$, two-tailed test

There was a significant difference in M scores for Negro as opposed to Caucasian subjects. Other contrasting variables showed no significant difference as illustrated in Table 8.

There was a significant difference in P scores for Negro as opposed to Caucasian subjects, for subjects with low visual quotients as opposed to those with high visual quotients, and for low-ability subjects as opposed to those

with high ability. Other contrasting variables showed no significant difference as illustrated in Table 9.

TABLE 9
PERFORMANCE (P) SCORES IN RELATION TO RESIDUAL VARIABLES

	\bar{X}	N	SS	VAR.	t
Negro vs Caucasian	17.86 14.21	14 70	47.73 358.94	3.67 5.20	5.51***
Female vs Male	14.91 14.77	30 54	165.38 379.23	5.70 7.16	.241
Low Sibling Q. vs High Sibling Q.	14.94 14.64	50 34	393.34 190.94	8.03 5.79	.505
Low Visual Q. vs High Visual Q.	13.92 13.14	33 29	77.19 17.11	2.41 .61	2.60*
Low Ability Q. vs High Ability Q.	14.55 12.99	18 16	53.86 4.37	3.17 .29	2.71**

*** p < .001, two-tailed test

** p < .01, two-tailed test

* p < .02, two-tailed test

Summary

The measures of certain variables of perception for individuals in this study were derived from tape recordings of the subjects' verbalizations in the presence of a series of distorted visual stimuli which they attempted to identify.

The tapes yielded response measurements for latency, magnitude, and performance. These three measures of perceptual functioning were examined for their relationship to age, socioeconomic level, and educational setting of the subject. Nine hypotheses were formulated regarding the expected relationship between the independent and the dependent variables, and these hypotheses were tested by one-tailed t tests.

Residual data regarding other conditions or characteristics were examined by two-tailed t tests. In the absence of prior research or theory to support the formulation of specific hypotheses for these remaining variables, the null hypotheses were examined.

Because of a lack of homogeneity in variance, the following hypotheses were examined by a separate-variance formula: Hypotheses Number 4, Number 6, and Number 7. Regarding the residual data, a separate-variance formula was employed for examining race on the L and M variables, and for examining visual quotients and ability quotients on the P variable only. All other data were examined by means of a pooled-variance formula.

The .05 level of significance was adopted for the purpose of interpreting the results of the statistical analysis of the data. An interpretation of the results is included in Chapter V.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this research was to determine if there existed differences regarding certain variables of perception in selected students viewing progressively accurate visual stimuli. Three variables of perception were measured: latency (L), magnitude (M), and performance time (P). Subjects varied in (1) age, (2) socioeconomic level, and (3) educational setting. In addition to these three major independent variables, several lesser characteristics or circumstances of the subjects were examined for possible relationship to perceptual behavior.

Twenty-two children, representing a normal and a remedial educational setting, and 62 adults, representing similar settings, were asked to "think out loud" while individually attempting to identify a series of distorted and improving visual images. Their responses were tape recorded and later subjected to stop-watch analysis and content examination, and the resulting scores for latency (L), magnitude (M), and performance time (P) were tabulated. These scores for certain variables of perception were examined for differences related to specific conditions or characteristics of separate groups.

Specific Findings

In order to facilitate the research proposed above, several hypotheses were predicated. Each of these hypotheses was subjected to statistical examination during the course of the study and will be reviewed in the light of those results.

Hypothesis Number 1. Children will have later latency than will adults in attempting to identify a distorted image of a commonplace object.

The samples were numerically disproportionate, but each group included a fairly balanced representation of socioeconomic level, educational setting, and other variables. There was pronounced difference in mean scores for the two groups, the variance was relatively low, and the statistical analysis yielded a t value beyond the .001 level of significance. Hypothesis Number 1 was strongly supported.

Hypothesis Number 2. Persons from lower socioeconomic levels will have later latency than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.

Although statistical analysis demonstrated differences in the direction predicted, the t value was not significant at the level adopted for the study. Two distinct socioeconomic levels were obtained in the sample of children, but a division of adults by Dictionary of Occupational Titles (D. O. T.) classification did not result in distinct groups because of the higher occupational level of families in the Cape Kennedy area. The writer believes that the adult portion of these groups contrasted upper-middle class with

middle- and lower-middle class, rather than with two more extreme socioeconomic levels. This fact gives importance to the differences, beyond the statistical importance demonstrated. Hypothesis Number 2 was not supported, but with the reservations stated above.

Hypothesis Number 3. Persons in readiness or remedial educational settings will have later latency scores than will persons in normal educational settings in attempting to identify a distorted image of a commonplace object.

The two groups were fairly well balanced numerically and included an adequate representation of other variables. There was pronounced difference in mean scores for the two groups. Although variance was relatively high for subjects in normal educational settings, the statistical analysis still yielded a t value significant beyond the .001 level. Hypothesis Number 3 was strongly supported.

Hypothesis Number 4. Children will have lower magnitude scores than will adults in attempting to identify a distorted image of a commonplace object.

Children showed very pronounced differences from adults in the magnitude of perceptions that they verbalized. Although the samples were not well balanced numerically, the two groups included adequate representation of other variables. The statistical analysis yielded a t value significant beyond the .001 level. Hypothesis Number 4 was strongly supported.

Hypothesis Number 5. Persons from lower socioeconomic levels will have lower magnitude scores than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.

The statistical difference in the number of perceptions verbalized by subjects from low socioeconomic level as contrasted with those from high socioeconomic level approached the .05 level of significance. This figure is impressive in view of the less extreme socioeconomic differences between the two groups. The indication is strong that the hypothesis is a valid one, and that it should be further explored with samples representing greater extremes of socioeconomic level. Hypothesis Number 5 was not supported.

Hypothesis Number 6. Persons from readiness or remedial educational settings will have lower magnitude scores than will persons from normal educational settings in attempting to identify a distorted image of a commonplace object.

The two groups were fairly well balanced numerically and included an adequate representation of other variables. There was pronounced difference in the mean scores for the two groups, and the difference was statistically significant beyond the .001 level. Hypothesis Number 6 was strongly supported.

Hypothesis Number 7. Children will require a longer time for correct performance than will adults in attempting to identify a distorted image of a commonplace object.

The two groups were not well balanced numerically, but did include an adequate representation of other variables. There was pronounced difference between the mean scores and relatively little variance in each of the two groups. The

statistical difference was significant beyond the .001 level. Hypothesis Number 7 was strongly supported.

Hypothesis Number 8. Persons from lower socioeconomic levels will require a longer time for correct performance than will persons from higher socioeconomic levels in attempting to identify a distorted image of a commonplace object.

The two groups were fairly well balanced numerically and included adequate representation of other variables. The statistical results were in the direction predicted, but Hypothesis Number 8 was not supported at the level of significance adopted for this study.

Hypothesis Number 9. Persons in readiness or remedial educational settings will require a longer time for correct performance than will persons in normal educational settings to identify a distorted image of a commonplace object.

The two groups were fairly well balanced numerically and included adequate representation of other variables. The statistical results were in the direction predicted, but Hypothesis Number 9 was not supported at the level of significance adopted for this study.

Regarding residual data, although small differences existed as evidenced in the tables in Chapter IV, the null hypothesis was accepted for all remaining independent variables, except as follows:

Null hypothesis for Negro vs. Caucasian. Statistical analysis indicated significant differences in favor of Caucasians as contrasted with Negroes on all three variables of perceptual functioning. However, the samples were ex-

tremely unbalanced numerically; further, the Negro sample included 11 children and only three adults. Of these 14 persons, 13 represented lower socioeconomic levels as defined in this study. Because the L, M, and P scores for children and for persons from lower socioeconomic levels were consistently inferior to those of adults and of persons from higher socioeconomic levels, the preponderance of these elements in the small Negro sample necessarily contributed to the poorer scores for Negroes in general. For these reasons, the writer felt that sampling error had invalidated the statistical results regarding a consideration of race, and that no hypotheses concerning racial differences per se could be formulated from this study.

Null hypothesis for low-visual-quotient subjects vs. high-visual-quotient subjects. These two groups did not evidence significant differences in latency and magnitude, but did evidence differences in performance scores in favor of those with high visual quotients. Differences were statistically significant beyond the .02 level on a two-tailed t test. All 62 adults were included in the analysis, and other variables were adequately represented in the two samples. This study indicated that earlier closure in response to visual clues is a perceptual characteristic of persons who engaged in many visually oriented pastimes in early childhood. Because of the commonplace nature of the slide content, it does not seem plausible that early closure was due to overfamiliarity with the subject matter, but that

other factors--perhaps those related to neurophysiological maturation and functioning--may be involved. Further research could be done in this area.

Null hypothesis for low-ability-quotient subjects vs. high-ability-quotient subjects. These two groups did not evidence significant differences in latency or magnitude, but did evidence differences in performance time which were statistically significant beyond the .01 level. The samples were small. The difference in performance time between the two groups was less than two seconds. Variance was relatively limited, especially among the high-ability group who performed within fractions of a second of the mean score for the group, and who consistently made correct identifications before the time of full focus (14 secs.). These results may be a further reflection of the operation of low or high visual quotients, or of socioeconomic level and educational setting. Because of the smaller number of subjects and the decreased representation of other variables, the results cannot be interpreted as conclusively as were those regarding differences deriving from visual quotients.

General Conclusions

Results of the statistical analyses confirmed the direction of differences predicted in all nine major hypotheses. The level of significance for those hypotheses regarding differences deriving from the socioeconomic level of the subject fell between the .10 and the .05 level of significance. It was concluded that the socioeconomic

classifications at the adult level were not so decidedly separate as would have been desirable and that further research which accomplished this distinction would also increase the level of statistical significance for differences in the variables of perception examined in this study.

Although highly significant differences in latency and magnitude were demonstrated for subjects in remedial vs. normal educational settings, the difference in correct performance time was not statistically significant. These results may indicate that students in such remedial settings could profit from training in perceiving more rapidly (e. g., tachistoscopic exercises) and in programs intended to increase fluency of thought (e. g., How many uses can you think of for a brick? --a newspaper? --etc.).

TABLE 10
MEAN SCORES: GROUPS 1, 2, 3, 4

	N	Latency	Magnitude	Performance
GROUP 1	10	15.77	12.50	18.19
GROUP 2	12	13.89	15.17	18.57
GROUP 3	26	8.26	23.42	14.29
GROUP 4	36	4.55	30.42	13.01

Although this study did not provide a statistical technique for examining a level of significance for percep-

tual differences among all four groups, Table 10 shows that latency, magnitude, and performance mean scores for each group support the general conclusions of this study.

In summary, statistical analyses of data in this study supported the major theory that certain perceptual behaviors in response to visual stimuli are improved or enhanced by the quantity and quality of past opportunities for perceiving. The study also showed that persons enrolled in educational programs designed to improve and facilitate learning, demonstrated poorer ability in those same perceptual behaviors. The inference was made that training programs which increased the number and kind of visual experiences could reasonably be expected to improve the perceptual functioning of these students. Some descriptive results of the study supported cognitive learning theory in demonstrating the imposition of the subject's perceptual set upon ambiguous visual information.

Some Descriptive Data

The very nature of the testing--individual rather than group, and completely unstructured choice of response--elicited large amounts of data not provided for in the plan of the study, but certainly pertinent to the purpose of the study. The writer would like to make note here of certain items of interest because of their possible implications for further research. Among the more noteworthy data are the following:

Most child subjects appeared uneasy or threatened by the testing. Twenty-one of the 22 child subjects were overly

serious and constrained in the testing situation. This despite the fact that especial care was taken to provide a friendly and relaxed environment, and to impart a feeling of participation in a "fun game."

Most adult subjects showed obvious delight and pleasure in the testing situation. Fifty-eight of the 62 adult subjects approached the testing situation with an attitude of ease; and no later than the onset of the second slide, they evinced joy and pleasure as part of their response.

Many adults made figure-ground reversals in their early identifications; only a few children did so.

Several adults became extremely stimulus-bound. These subjects overstructured the visual clues to the extent that even after the image became fully focused, they experienced obvious difficulty in revising their conceptualization.

Two children (Subjects 107 and 209), after having viewed Slide 1, avoided looking at subsequent images until the visual clues were improved. These subjects would look around the room, study their shoes, and glance at the screen only occasionally. When the picture was nearly focused, they fixed their gaze on the image and began to respond.

Two children (Subjects 104 and 203) attempted to identify only the contents of the outstretched hand of the silhouetted figure of a man (Slide 7). Neither child ever verbalized the major content of that particular slide.

One child (Subject 101) began the identification of every slide with a sing-song chant, unrelated to the task at

hand, exhibiting a wide range of vocal pitch and volume and discharging a great deal of emotional tension. As each slide became nearly focused, the subject performed in a more normal manner. This subject's latency scores were revised to conform to the time at which verbalization related to content was apparent.

At least one adult (Subject 325) showed a tendency to repudiate the most recent perception before proceeding to a new one. Other adults occasionally behaved in the same way, but not markedly so.

Some subjects showed a preference for color clues (e. g., Subject 304) or for form (e. g., Subject 424). Some subjects showed decided perceptual set (e. g., Subject 431, a science student, and Subject 304, a weekend surfboard enthusiast).

One adult (Subject 401) made frankly emotional responses to several slides.

Some low ability-low achievement subjects (e. g., Subject 320, average scores at 11th percentile) performed at a very high level on this test.

Slide 2 (Mail truck) elicited in many subjects a perceptual set for blue above a horizon, and green below. The reversed order of color caused subjects to say that the slide was upside down.

Perceptual sets in the Cape Kennedy population were demonstrated by frequent reference to objects such as diodes, transistors, rockets, and spacecrafts.

An exhaustive account of the descriptive data is not feasible in this report. Only the most striking descriptive data, and hopefully the most pertinent, have been noted here.

Discussion

The writer proposes at this point to go beyond the information given and to suggest possible underlying causes and mechanisms in the behavior described above.

Apart from confirmation of most of the major hypotheses, this study has had at least one other important consequence not hypothesized by the writer, and in fact not even seriously entertained, except as an isolated and unusual experience. But the data from this study indicated that many a normal adult subject, exposed to substandard information can so overstructure an internal response as to be unable subsequently to correctly perceive a very clear and undistorted image only two and one-half feet removed in his line of vision. The possibility of a normal subject becoming stimulus-bound is a very valid phenomenon. It was the writer's impression in these cases that the subject experienced some personal discomfort. The facial expression was that of a person confounded or immobilized. But there was also a communication of awareness and ambivalence. For want of a better expression, it might be said that the subject communicated a paralyzing "cognitive dissonance," during which one level of awareness informed him of error while another

level of awareness continued to reverberate a perseverative and erroneous signal. Most adults recovered quickly from this upsetting experience and successfully revised their perceptions, but for two subjects the experience was so strong and the discomfort so obvious that the tester having remarked, "Then you are sure this is a flower, are you?" proceeded to the next slide. The subjects were not informed of their error.

Although the tester sometimes thought a child was becoming stimulus-bound, no such judgment was recorded in the list of verbalizations unless a subject had (1) already verbalized a perception and failed to revise it at the time of full-focus, or (2) made an incorrect identification after the time of full-focus.

It should be noted also that children seldom evidenced figure-ground reversals, although these occurred very frequently for adults. The writer suspects that this circumstance was a function of early or late latency. The latency mean score for children (14.75 secs.) indicates a time beyond the point of full focus. Adults responded earlier (mean score: 6.11 secs.) and therefore were perceiving from highly distorted clues and more susceptible to making the figure-ground error.

The fact that two children completely failed to identify the major content of one slide may be an artifact of the picture itself, in that an outstretched hand could have signified for these children a special importance for what the

hand contained. In a clinical setting, however, the same behavior might be examined as a possible indication of denial.¹ One subject was a little Negro girl, an only child living with her mother. The other was a little white girl whose siblings were all boys; ages 4, 6, and 7 years.

As a final item of discussion regarding the descriptive data, the writer feels that this particular testing instrument and the testing situation in general provided many insights into the personality of the subject being tested. Performances were unique. Each little child seated with the new lady, alone, in the testing room, confronted with an invitation to solve the impossible problem, responded in ways that cannot be brought to life for the reader of his typewritten record of verbalizations. Each young adult, responding for the most part with pleasure in the presence of a beautiful and changing light, getting hung up, getting angry with himself or laughing at himself, very probably made more honest and open declaration of his being than he could ever have made in a more conventional form of testing.

Suggested Research

The present study engendered many related questions. Some which the writer feels may be worthy of investigation are as follows:

¹Denial. In psychoanalytic theory, the refusal to admit certain information to consciousness; a defense mechanism employed for the blocking of intense emotion.

1. What would be the possibility of using this technique not to test perceptual behaviors, but to train and improve them?

Imagine a knowledgeable teacher arresting a slide to ask such questions as these: What could this be? Why? Show me an object in the picture that looks square. How many things can you name right now that are square? What color is in the upper part of the picture? Can you name some things that are blue-green? Now that I have made the picture clearer, what new ideas do you have?

The use of slides in distortion might be a very economical way for presenting literally hundreds of subtle differences in form, color, and composition, and training students to differentiate more clearly; even, perhaps, to think more rapidly.

2. What is the real significance of the stimulus-bound experience?

Does it occur universally, i. e., is every person a possible candidate for this experience? If so, why so? If not, why not?

3. What is the meaning of undoing a perceptual behavior, i. e., the repudiation of one perception before the formation of a new one.

4. Do visually oriented pastimes engaged in during early childhood contribute to facility in perceptual closure from visual data?

If so, are there upper limits to the time in the maturational process when such facility can be developed, or could such facility also be acquired later in life?

5. Would persons designated as (1) convergent and conforming thinkers, or (2) divergent or creative thinkers, also show differences in latency (L) and magnitude (M) scores?

Furthermore, could a subject be trained to one or the other form of thinking by being taught certain forms or patterns for the storage of information and its later retrieval or rearrangement?

6. Would the changing visual image have value as a testing instrument in the assessment of personality dynamics?

Verbalizations from the subjects tested in this project indicated that persons responded with many similarities. Equally important, they exhibited interesting differences. There is, therefore, the strong probability that such a test could be scored as to color, content, and form, and could be normed, a sort of motion-picture Rorschach.

7. Is there any connection between the delight exhibited by an overwhelming majority of the adult subjects in this study and the current interest in psychedelic lighting or pictures?

In other words, has a beautifully colored, minimally structured moving picture the ability to evoke emotional as well as cognitive responses that are of cathartic and useful nature? And, fraught with danger as the possibility may be, would such pictures have equal value for the emotionally disturbed and insane, or be deleterious? And why?

APPENDIX A
QUESTIONNAIRES AND FORMS

With the permission and cooperation of your classroom teacher, you have been selected to participate in an experiment in the area of perceptual psychology.

DATE: _____

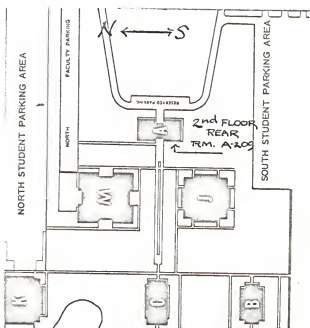
TIME: _____

PLACE: _____

Please meet on the second floor rear landing of Building A at the designated time. Chairs will be provided for you so that you may sit and read or talk while you are waiting to be tested.

Each student will be tested separately. The experiment involves your viewing ten pictures presented out of focus. You will be asked to identify these picture slides while they are being brought into focus. Your responses will be tape recorded. An individual session requires from 5 to 10 minutes.

Thank you for participating in this research.



Corinne O'Brien
Counselor
Brevard Junior College
Cocoa, Florida

(SAMPLE OF ADULT QUESTIONNAIRE)

GROUP NO. _____
SUBJECT NO. _____

NAME _____
STUDENT NO. _____

DATE OF BIRTH: (mo.) _____ (da.) _____ (yr.) _____

MOTHER'S OCCUPATION: _____

FATHER'S OCCUPATION: _____

IS EITHER PARENT DECEASED, DIVORCED, OR ABSENT FROM THE HOME? _____

SUBJECT LIVES WITH _____

AGES OF MALE SIBLINGS _____ AGES OF FEMALE SIBLINGS _____

TYPE OF ACADEMIC PROGRAM CURRENTLY ENROLLED IN: _____

FUTURE EDUCATIONAL AND VOCATIONAL GOALS: _____

DO YOU WEAR GLASSES? _____ IF YES, WHY? _____

HAVE YOU HAD AN EYE EXAMINATION WITHIN THE PAST YEAR? _____

IF YOU HAVE NOT BEEN RATED AS HAVING 20/20 VISION, PLEASE COMMENT HERE REGARDING THE

DIAGNOSIS AND THE DEGREE OF CORRECTION WITH LENSES: _____

THANK YOU.

(SAMPLE OF FORM USED TO DETERMINE A VISUAL QUOTIENT)

AS A CHILD, DID YOU -

-READ BOOKS? () Rarely () Occasionally () Frequently

-DRAW AND COLOR? ()Rarely ()Occasionally ()Frequently

-GO TO MOVIES? () Rarely () Occasionally () Frequently

-WATCH
TELEVISION? ()Rarely ()Occasionally ()Frequently
 ()Not Applicable

-TRAVEL WITH
THE FAMILY? ()Rarely ()Occasionally ()Frequently

Method of Scoring for a Visual Quotient

Score values of 1, 3, and 5 were assigned for responses, and a value of 3 was assigned for the response, not applicable. Scores ranged from 7 to 15, with a mean score of 11.17. Scores of 11 or lower were classified as low (18 subjects); scores of 12 or higher were classified as high (16 subjects).

APPENDIX B

BLACK AND WHITE REPRODUCTIONS OF

35 mm COLOR SLIDES



PLATE 1



PLATE 2



PLATE 3

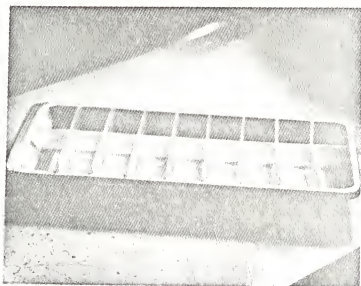


PLATE 4

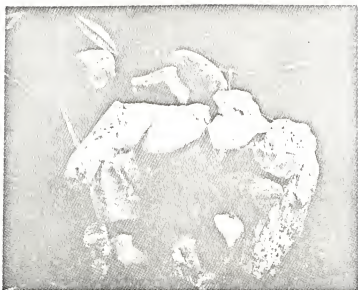


PLATE 5



PLATE 6

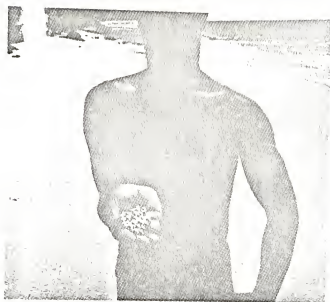


PLATE 7

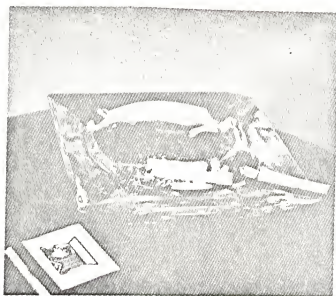


PLATE 8

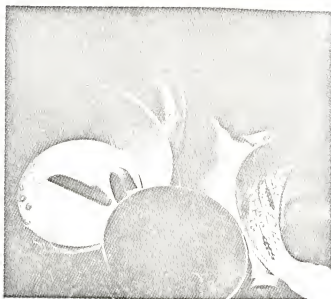


PLATE 9



PLATE 10

APPENDIX C
VERBALIZATIONS

VERBALIZATIONS

Symbols

- S - Number by which an individual subject is designated here and in the text.
 SL - Number of a particular color slide.
 (See Appendix B)
 (L) - Latency score expressed in seconds.
 (P) - Performance score expressed in seconds.
 SP - Substandard performance.
 SB - Stimulus-bound.
 FG - Field-ground reversal.

Setting 1: Kindergarten, Operation Headstart

S	SL		(L)	(P)
101	1	a man -- a man -- a man -- a man -- a tree -- a tree (2.2)*	10.8	10.8
	2	a man -- a man -- a man -- a man -- a man -- a man -- mailbox (SP) (3.0)	20.8	20.8
	3	a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- that's flowers (1.8)	19.0	19.0
	4	a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- ice coppers (1.2)	26.8	26.8
	5	a man -- a man -- a man -- a man -- a man -- a man -- rocks (3.4)	14.0	14.0
	6	(I'm tired) a man -- a man -- a man! -- a man -- a man -- a man -- a man -- a man -- silverware (2.2)	32.2	32.2
	7	a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man (3.2)	09.0	09.0
	8	a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- ash tray (0.2)	14.0	14.0
	9	a man -- a man -- a man -- a man -- a man -- a man -- a man -- a man -- dish (SP) (0.2)	21.2	21.2
	10	a man -- a man -- a man -- a man -- (SP) (0.2)	09.2	09.2

*This subject's latency scores were arbitrarily revised by the tester for reasons discussed in the text.

S	SL		(L)	(P)
102	1	tree	14.0	14.0
	2	mailman (SP)	16.4	16.4
	3	a shovel tree with white flowers (SP)	13.8	13.8
	4	ice tray	14.0	14.0
	5	a bag on a tree -- rocks	11.2	19.2
	6	knife, spoon, fork	14.0	14.0
	7	a man	22.8	22.8
	8	a bowl -- ash tray	02.2	23.6
	9	dishes	23.2	23.2
	10	picture -- Superman	17.2	22.6
103	1	tree	20.8	20.8
	2	mailbox -- mailman	21.8	24.0
	3	flowers	16.8	16.8
	4	plate -- ice tray	25.0	32.0
	5	rocks	17.8	17.8
	6	spoon, fork, knife	17.6	17.6
	7	man	18.2	18.2
	8	ash tray	17.6	17.6
	9	pans (SP)	16.2	16.2
	10	Superman	14.8	14.8
104	1	tree	22.8	22.8
	2	mail truck	15.4	15.4
	3	flowers	15.2	15.2
	4	icebox tray	15.6	15.6
	5	rocks	14.0	14.0
	6	going on a plane -- forks, knife, and a spoon	04.2	14.2
	7	rocks -- in his hand (SP)	14.8	22.4
	8	ash tray, cigarette in it	14.0	14.0
	9	glass, a cup and a saucers (sic)	15.8	15.8
	10	Superman	14.2	14.2
105	1	tree	26.8	26.8
	2	truck -- mail truck	11.8	12.2
	3	flowers	17.6	17.6
	4	ice tray	13.8	13.8
	5	candy -- rocks	13.0	18.2
	6	fork, spoon, and knife	14.0	14.0
	7	a man	13.6	13.6
	8	tray with cigarettes	13.4	13.4
	9	plates and dishes	14.2	14.2
	10	Superman	14.2	14.2
106	1	tree	14.8	14.8
	2	mailman's truck	12.6	12.6
	3	flowers	14.6	14.6
	4	icebox (SP)	17.0	17.0

S	SL		(L)	(P)
106	5	flower (SB) -- candy -- leaves -- rocks	18.2	34.0
	6	fork, knife, spoon	16.4	16.4
	7	man	17.2	17.2
	8	ash tray	17.6	17.6
	9	plates	14.4	14.4
	10	bible (FG) -- Batman (SP)	16.2	27.8
107	1	tree	16.2	16.2
	2	mail truck	12.6	12.6
	3	flowers	18.4	18.4
	4	man have to go, a car -- ice bowl (SP)	03.8	16.2
	5	leaves (SB) -- ice bowl (SP)	17.0	24.6
	6	spoon, knife, fork	17.8	17.8
	7	man with flowers	14.0	14.0
	8	silverware (SB) -- matches, ash tray	18.2	24.0
	9	plates	15.0	15.0
	10	Superman	16.2	16.2
108	1	tree	15.0	15.0
	2	bus (SP)	18.2	18.2
	3	flowers	13.8	13.8
	4	biscuit pan (SP)	20.4	20.4
	5	flower (SB) -- rocks	14.0	21.0
	6	fork, knife, spoon	15.6	15.6
	7	man	14.4	14.4
	8	ash tray	13.6	13.6
	9	spoons, cups, glasses	15.8	15.8
	10	Superman	14.6	14.6
109	1	tree	18.0	18.0
	2	mailman's ride	20.4	20.4
	3	tree -- apple tree (SP)	20.2	29.4
	4	frying pan -- cake pan -- an ice pan	16.4	36.0
	5	rocks	19.0	19.0
	6	spoon, knife, fork	16.2	16.2
	7	a hand -- a man	13.2	24.0
	8	table for ash tray, cigarettes	17.4	17.4
	9	dishes	14.0	14.0
	10	Superman	17.2	17.2
110	1	a light (FG) -- tree	05.8	22.2
	2	mailman's truck	17.8	17.8
	3	chestnut tree (SP)	19.0	19.0
	4	book (SB) -- ice tray	09.2	29.0

S	SL		(L)	(P)
110	5	flower (SB) -- no, all I see is it's still a flower (SP)*	11.2	26.0
	6	fork, knife, spoon	19.2	19.2
	7	a man	15.8	15.8
	8	butter -- ash tray	12.2	20.8
	9	a hand -- plates	06.6	23.2
	10	Superman	14.2	14.2

Setting 2: Kindergarten, University Summer Laboratory School

S	SL		(L)	(P)
201	1	tree	14.2	14.2
	2	mailman (SP)	22.2	22.2
	3	flowers	13.2	13.2
	4	sandbox -- ice tray	11.6	18.6
	5	nest (SB) -- rocks	15.8	25.0
	6	night light -- silverware	12.8	16.2
	7	person	17.0	17.0
	8	ash tray	14.8	14.8
	9	dishes	15.8	15.8
	10	Superman	14.6	14.6
202	1	tree -- tree	12.8	12.8
	2	mail truck	12.8	12.8
	3	flowers	16.2	16.2
	4	what you put ice in (SP)	16.4	16.4
	5	rocks	15.0	15.0
	6	light -- knife and spoon and fork	03.2	14.6
	7	flower -- man holding flower	15.2	16.8
	8	ash tray and matches	17.2	17.2
	9	dishes	15.2	15.2
	10	Superman	16.2	16.2
203	1	sky (FG) -- sea (FG) -- ocean (FG) -- tree	00.2	13.6
	2	mail truck	13.6	13.6
	3	tree -- flowers	10.8	14.8
	4	looks like a letter -- something for ice (SP)	11.4	22.2
	5	looks like a fern -- a flower! -- no, rocks	04.8	15.2
	6	I think it's a spoon -- silverware	05.6	15.8
	7	a flower -- it <u>is</u> a flower -- (in man's hand)**	16.2	35.0

*Subject did not revise the misperception even after being encouraged by the tester to do so.

**Elicited by tester.

S	SL		(L)	(P)
203	8	a ball and a hand -- matches and ash tray	02.8	14.8
	9	pears -- food, I was right! (SB) -- no, dishes	04.2	16.2
	10	it's small -- Superman	08.0	14.2
204	1	tree	14.2	14.2
	2	truck for mail	18.8	18.8
	3	flowers	16.2	16.2
	4	dish (SB) -- a tray -- a tray for ice	15.2	20.2
	5	flowers (SB) -- a rock flower	15.2	19.0
	6	spoon, knife, and fork	16.4	16.4
	7	a boy holding something	19.2	19.2
	8	tray and cigarettes and matches	15.8	15.8
	9	dishes	17.2	17.2
	10	a man catching something (SP)	17.2	17.2
205	1	sky (FG) -- tree	04.2	19.6
	2	beads -- mailman (SP)	00.8	17.6
	3	sun -- a table with flowers on it	02.2	15.8
	4	bed -- table with ice cubes on it	06.6	21.0
	5	rocks	17.8	17.8
	6	a birthday (candles) -- boat (SB) -- silverware	00.4	22.4
	7	egg (FG) -- man with beads in his hand	00.6	21.0
	8	flower -- dish of something -- table with ash tray on it	10.8	13.6
	9	water -- sink with dishes and stuff' in it	02.2	18.2
	10	a man -- a man flying -- Superman	03.2	18.0
206	1	a tree	14.2	14.2
	2	a mail truck	18.6	18.6
	3	a snow-white -- a flower	14.6	14.8
	4	looks like ice	16.2	16.2
	5	looks like rocks	14.8	14.8
	6	looks like knife, fork, spoon	18.0	18.0
	7	looks like a man	18.8	18.8
	8	looks like an ash tray	15.8	15.8
	9	vegetables (SB) -- dishes	21.6	39.0
	10	a man -- Superman	21.4	30.2
207	1	leaves -- tree	12.2	12.8
	2	mail truck	15.6	15.6
	3	roses -- flowers	24.0	24.2
	4	pool table (SB) -- you put balls in it (rack) -- ice tray	14.6	31.4
	5	rocks	13.8	13.8
	6	fork and a spoon -- silverware	18.4	18.4

S	SL		(L)	(P)
207	7	a man	15.8	15.8
	8	silverware (SB) -- cigarette and an ash tray	14.0	16.6
	9	dishes	14.6	14.6
	10	Superman	15.4	15.4
208	1	somebody that was . . . (FG) -- tree	08.2	14.0
	2	looks like a television -- a mail truck	09.2	25.2
	3	looks like a table -- flowers	06.8	14.8
	4	table -- ice tray	06.8	17.2
	5	tinker toys -- tinker toys and a pole -- rocks	04.8	22.2
	6	table (FG) -- knife, fork, spoon	14.0	27.0
	7	a beach with a man on it holding something	15.4	15.4
	8	bowl -- ash tray	05.8	15.2
	9	ball -- plates	05.2	16.8
	10	table (FG) -- couch (FG) -- flower -- Superman	03.4	17.6
209	1	tree	21.0	21.0
	2	mailman (SP)	24.6	24.6
	3	daisies	16.4	16.4
	4	ice tray	45.6	45.6
	5	ball of rocks	17.8	17.8
	6	fork, knife, spoon	24.0	24.0
	7	man	13.2	13.2
	8	matches, cigarette and ash tray	14.8	14.8
	9	dishes	19.4	19.4
	10	cartoon -- Superman	17.2	21.0
210	1	tree	16.6	16.6
	2	mailman (SP)	21.0	21.0
	3	flowers	16.8	16.8
	4	a bathtub (SB) -- to put soap in -- to put ice in (SP)	20.2	52.6
	5	rocks	20.4	20.4
	6	knife, fork, spoon	16.0	16.0
	7	man	16.8	16.8
	8	table, cigarettes and some matches (SP)	16.8	16.8
	9	dishes	17.0	17.0
	10	Superman	16.2	16.2
211	1	tree	15.2	15.2
	2	pond -- mailman's truck	06.0	22.2
	3	tree -- flowers	17.6	18.8
	4	car -- ice box (SP)	06.0	18.2
	5	rocks	19.0	19.0

S	SL	(L)	(P)
211	6	spoon, knife, and fork	16.2 16.2
	7	orange -- flower (FG) -- a man	07.2 07.8
	8	matches and an ash tray	16.2 16.2
	9	dishes	17.2 61.0
	10	Superman	17.4 17.4
212	1	tree with leaves	18.8 18.8
	2	mail truck	16.6 16.6
	3	flower with a hand	16.4 16.4
	4	looks like a flame-thrower thing -- ice tray	04.8 14.2
	5	blue -- little rocks	11.0 15.2
	6	fork, knife, and spoon	14.0 14.0
	7	man with something in his hand	18.0 18.0
	8	ash tray with matches	16.2 16.2
	9	dishes	19.0 19.0
	10	Superman	16.8 16.8

Setting 3: Junior College, Remedial Non-Credit

S	SL	(L)	(P)
301	1	tree -- plant -- tree	05.8 13.8
	2	swimming pool -- with round life pre-server or something on it -- mail truck	03.4 13.8
	3	sunset -- street lamps aglow -- flowers	03.6 13.0
	4	looks like a boat -- ice tray	09.2 16.2
	5	flowers -- rocks	01.8 14.4
	6	silverware	10.6 10.6
	7	shadow of a person -- picture of a person	09.0 13.0
	8	fruit -- ash tray with matches	04.6 13.6
	9	flowers -- dinnerware	08.2 14.4
	10	skier -- Superman	12.2 14.6
302	1	clouds (FG) -- tree -- two people -- tree	11.8 14.0
	2	ice -- ark -- boat -- mail truck	07.0 14.2
	3	flowers -- trees -- bugs -- flowers	00.2 13.2
	4	ice cube -- ash tray -- table -- ice cube tray	00.2 14.0
	5	flowers -- insects -- man -- flower -- rocks	00.2 13.8
	6	rainbow -- a till -- scissors -- knife, fork, spoon	00.2 13.8
	7	vegetables -- person	00.2 10.8
	8	orange -- butter -- onions -- ash tray and matches	03.4 12.0
	9	hand -- thumb -- leaves -- brush -- dishes	03.0 14.0
	10	tree (FG) -- bird -- man (SP)	09.4 14.0

S	SL		(L)	(P)
303	1	two people (FG) -- tree -- tree	03.6	09.8
	2	piece of cake or pie -- mail truck	07.2	12.2
	3	oranges -- flowers	01.0	13.8
	4	pan -- ash tray	08.8	13.8
	5	apple -- something round -- rocks	01.2	12.8
	6	spoon, knife, and fork	13.8	13.8
	7	hammer -- iron--human	06.2	12.4
	8	orange -- ash tray and matches	02.0	12.2
	9	eggs -- plates, dishes	02.8	14.0
	10	Superman	13.2	13.2
304	1	something green down the middle -- vegetation -- tree	02.5	12.8
	2	something blue-green -- boat on a lake -- mail truck	01.8	12.8
	3	something yellow and bright -- dessert -- something green because it's . . . -- flowers	01.8	14.2
	4	body of water -- greenish blue -- ice pan	01.8	13.0
	5	fish under water -- flowers or greenery -- rocks	03.2	13.8
	6	closeup of a small object -- utensils, eating type	02.0	10.0
	7	closeup of a single object -- a person -- shadow or picture of a person	04.8	09.6
	8	dock or something in the water -- table top -- ash tray and matches	01.8	12.2
	9	blue objects -- light bulbs -- dishes	02.2	12.8
	10	one spot in the middle -- small object -- jewelry -- Superman	04.6	14.2
305	1	plant -- weed -- tree	06.2	14.2
	2	house in the snow -- mailman -- mail truck	10.2	14.4
	3	sun (FG) -- tree -- flowers	02.0	14.4
	4	building -- swimming pool -- ice tray	11.8	18.2
	5	flower -- white flower with green leaves (SB)*	09.0	44.0
	6	orange and red in the background -- two pieces of chalk -- knife, fork, and spoon	03.0	14.0
	7	figure -- shadow on the wall -- person with something in his hand	07.8	14.2
	8	Easter eggs -- cigarettes and ash tray on table	04.2	12.2

*Subject did not revise the misperception even after being encouraged by tester to do so.

S	SL		(L)	(P)
305	9	blue background -- something white -- dishes	04.4	14.2
	10	skier in the snow -- skier jumping off cliff -- an Olympic skier (SB)	12.2	39.0
306	1	chest X-ray -- tree -- tree	03.2	12.1
	2	mail truck	13.0	13.0
	3	morning time sky -- flowers	05.0	13.2
	4	pieces of paper -- pan -- ice tray	00.2	13.6
	5	apple -- acrobat -- flower (SB) -- rocks	01.4	19.0
	6	knife, spoon, fork -- table silverware	08.8	08.8
	7	bottle of medicine -- no, man on the beach	12.0	13.0
	8	pieces of fruit -- two pieces of fruit -- ash tray and matches	02.8	11.4
	9	dishes, dirty dishes	13.2	13.2
	10	bird -- Superman	09.8	13.0
307	1	two faces -- profiles smiling (FG) -- an anchor -- okay, it's a tree	02.8	15.2
	2	telephone -- mail truck	08.6	14.0
	3	witch flying -- flowers	09.2	14.0
	4	flying hat on a nun -- book -- ice cube tray	03.2	13.8
	5	caterpillar from the front, exploded view -- bunch of rocks	02.8	14.6
	6	a bumblebee flying -- knife, fork, and spoon	03.2	13.6
	7	somebody holding a hammer upright -- a figure -- a statue -- man holding pearls	02.6	14.2
	8	sunset -- a pat of butter -- matches and ash tray	01.2	13.2
	9	bunch of rocks -- dirty dishes in the sink	09.8	14.0
	10	a parrot -- a bird -- Superman	09.8	14.0
308	1	tree	12.2	12.2
	2	lake -- boat on it -- mailman (SP)	06.8	18.0
	3	man dead (bier) -- flowers	08.0	13.8
	4	book on a table -- ice tray	08.8	13.0
	5	bunch of rocks	15.8	15.8
	6	spoon, knife, fork	10.0	10.0
	7	person	09.4	09.4
	8	ash tray	12.0	12.0
	9	fruit -- bowl of fruit -- cups and dishes	08.2	16.4
	10	Superman	14.0	14.0

S	SL	(L)	(P)
309	1 tree	12.8	12.8
	2 mail truck	12.2	12.2
	3 sea plant -- flowers	13.2	24.8
	4 I thought it was an ice tray, but it isn't (SB) -- yes, it is an ice tray	14.0	33.8
	5 a flower -- rocks	06.2	11.8
	6 ship -- a spacecraft -- fork, knife, and spoon	07.2	13.8
	7 a man with something in his hand	12.8	12.8
	8 an ash tray and matches	13.0	13.0
	9 flowers -- cup, saucer and all	09.2	18.0
	10 beautiful bird -- a man -- Superman	11.2	14.0
310	1 tree	13.2	13.2
	2 boat in the sea -- mailman (SP)	05.8	14.0
	3 a crocodile, yes -- flower	13.0	14.0
	4 pan -- ice tray	12.2	13.8
	5 flowers -- rocks	06.4	15.0
	6 wooden sticks -- silverware	10.8	14.0
	7 handles (FG) -- a man	10.0	13.0
	8 ash tray	13.0	13.0
	9 bowls -- bowls (SP)	13.0	13.0
	10 flowers -- a man -- a man jumping -- Superman	11.0	29.0
311	1 tree -- plant -- rosebuds -- two Y's -- tree	05.8	14.0
	2 it's upside down -- sky below, grass above -- mail truck	03.8	14.0
	3 sunset -- bird in sunset -- sunflowers	03.0	17.2
	4 ice tray	15.0	15.0
	5 man -- baseball comic strip cartoon -- man in comic strip -- rocks	05.8	17.2
	6 red and white -- ball -- spacecraft -- fork, knife, and spoon	03.8	14.0
	7 an embryo -- egg -- shell diver	02.2	16.2
	8 sun -- sky -- sunset -- butter -- matches -- and ash tray	01.8	14.0
	9 underwater -- aquarium -- fish and rocks -- shells and marbles -- dishes	04.0	19.0
	10 sunset with something in middle -- bird -- Superman	02.8	14.6
312	1 tree	14.0	14.0
	2 car -- mail truck	11.0	15.0
	3 flowers	12.8	12.8
	4 bed -- table -- ice tray	08.8	18.8
	5 flower -- stones	10.2	15.0
	6 fork, knife, and spoons	16.2	16.2
	7 a man	14.6	14.6

S	SL	(L)	(P)
312	8 orange -- ash tray	06.2	13.2
	9 cups and vases (SP)	14.0	14.0
	10 man -- Superman	13.8	14.2
313	1 two faces (FG) -- a tree	04.2	13.0
	2 mail truck	13.8	13.8
	3 flowers	12.8	12.8
	4 beach scene -- boat -- no, ice tray	03.0	15.0
	5 flower -- rocks	06.8	13.8
	6 knife, fork, spoon	08.2	08.2
	7 person	07.6	07.6
	8 fruit -- ash tray	03.0	09.4
	9 dishes	13.0	13.0
	10 bird -- no, Superman	12.8	13.8
314	1 tree	08.0	08.0
	2 flower -- but, then the green back-ground doesn't . . . -- mail truck	07.8	13.4
	3 eye of a person -- flowers	04.2	14.0
	4 ship on the ocean -- a dory -- a Japanese pagoda -- ice tray	03.2	14.2
	5 man lying on a divan -- boy, that's a good one! a campfire or collection of rocks	03.0	15.8
	6 red and white background -- a test tube -- matches -- knife, fork, and spoon	03.0	14.0
	7 how about that! a man holding pebbles in his hand	16.0	16.0
	8 a pillow on a couch -- o boy, an ash tray	06.2	15.4
	9 a spoon -- cup -- sink full of dishes	10.2	14.0
	10 just a person in the middle of the sand -- a skydiver -- Superman	06.2	14.2
315	1 clouds (FG) -- tree	07.2	15.2
	2 ball -- a mail truck	03.2	14.0
	3 orange -- flower	06.0	14.8
	4 tub -- bath tub -- ice tray	05.0	16.2
	5 bird -- parrot -- rocks	03.2	14.2
	6 silverware	14.2	14.2
	7 two persons (FG) -- person	05.4	13.0
	8 marbles -- ash tray	05.8	13.8
	9 light bulbs -- plates and cups	04.8	16.2
	10 sheet of paper (FG) -- Superman	03.2	14.2
316	1 a tornado (FG) -- tree -- a tree	01.2	07.2
	2 football field upside down -- people standing there -- mail truck	00.8	13.2
	3 neutral background -- kangaroo -- owls (SB) -- still don't know . . . it's flowers	07.2	18.8

S	SL		(L)	(P)
316	4	pool -- swimming pool -- bird bath -- tin cans sitting on something -- ice cub tray	01.0	12.2
	5	pretty weird, I don't know . . . rocks	14.0	14.0
	6	something sitting on an orange thing , -- jewelry -- a pin -- knife, fork, spoon	06.4	12.8
	7	sword handle -- lamp base -- spreading ink blot -- man holding something	01.4	14.4
	8	golf balls -- cube -- dishes -- still see a cube -- ash tray and matches	00.8	12.2
	9	something round -- cups with dishes	07.8	12.2
10		something black and orange -- bug -- pair of pliers -- no, Superman	09.2	15.2
317	1	tree -- yes, a tree	09.8	09.8
	2	something upside down -- a house -- a building -- a mail truck	07.8	14.6
	3	pile of bricks -- flowers	08.0	14.0
	4	building -- an ash tray	07.2	13.2
	5	some kind of fruit -- flowers -- bunch of rocks	02.2	14.4
	6	some kind of . . . -- knife, fork, and spoon	13.0	13.0
	7	an old fashioned phone -- a person	04.8	10.4
	8	ash tray	11.2	11.2
	9	bunch of fruit -- dishes	05.8	13.2
10		Superman	10.8	10.8
318	1	tree -- the bark and leaves in background	04.8	04.8
	2	green grass in background -- it's a mail truck	07.2	13.0
	3	it's like . . . flowers	13.4	13.4
	4	I don't know what it is (SB) -- ice tray	25.0	25.0
	5	it's flowers -- plants -- stones	12.0	17.0
	6	it's a fork, knife, and spoon	13.8	13.8
	7	it's a person on the beach	09.8	09.8
	8	oranges -- fruit -- basket of fruit on a table -- cigarettes and ash tray	04.8	15.2
	9	dishes	13.2	13.2
10		it's a person flying -- Superman	11.2	16.0
319	1	plant -- tree -- tree	06.0	07.6
	2	lake -- boat -- mail truck	04.2	13.8
	3	person bending over -- flowers	09.2	13.0
	4	table -- tray -- ice tray	09.2	13.2
	5	plant -- person -- rocks	05.8	14.0

S	SL		(L)	(P)
319	6	pin on a dress -- knife, fork, spoon	04.2	15.0
	7	a vase -- a drinking mug -- a person	03.8	13.2
	8	food -- ash tray	06.8	12.2
	9	dishes	16.2	16.2
	10	picture -- Superman	12.2	13.8
320	1	two people (FG) -- two skeletons (FG) -- a tree	01.6	13.6
	2	big blob of green and white -- trees in background -- humans -- mail truck	09.2	13.2
	3	yellow light (FG) -- cloud -- daisies	04.4	12.0
	4	shaver -- typewriter -- ice tray	04.8	12.8
	5	blob with an extra head -- hand -- human carrying something -- rocks	01.2	15.0
	6	passion -- red -- exclamation point with a dot -- silverware	08.2	13.2
	7	something coming apart (FG) -- two hands (FG) -- pet fly (SB) -- a man	05.0	18.2
	8	nut -- harvest squash -- matches and ash tray	03.0	14.0
	9	night with spot lights, shining bright -- lions -- potatoes -- cantalopes -- dishes	01.8	14.0
	10	something light -- an animal -- a man, Superman	13.0	14.2
321	1	facial expressions (FG) -- busts (FG) -- capillaries -- tree	06.0	16.2
	2	mail truck	14.0	14.0
	3	some kind of plant -- flower	14.0	16.8
	4	some kind of pan -- ice tray	09.0	14.4
	5	rocks	14.0	14.0
	6	something green -- knife, fork, spoon	14.0	14.0
	7	trophy -- picture of a man	12.0	14.4
	8	cubic thing on the left -- ash tray and matches	09.2	14.8
	9	plates	18.0	18.0
	10	picture of Superman	16.0	16.0
322	1	rabbits (FG) -- tree	04.2	15.4
	2	boat -- mail truck	06.4	16.2
	3	plant -- flowers	09.0	16.2
	4	book -- ice tray	07.8	15.0
	5	painting -- rocks	10.8	15.4
	6	a fly -- knife, fork, and spoon	04.8	14.0
	7	a man	14.8	14.8
	8	cushion -- an ash tray	10.2	13.0

S	SL		(L)	(P)
322	9	balls (SB) -- dishes	14.8	18.0
	10	Superman	14.0	14.0
323	1	tree	14.4	14.4
	2	mailman's truck	14.0	14.0
	3	flowers	13.2	13.2
	4	lake -- ice tray	11.8	16.0
	5	rocks	18.2	18.2
	6	knife -- silverware	14.6	14.8
	7	person on the beach	16.8	16.8
	8	mountain -- ash tray	13.2	18.8
	9	bowls (SP)	14.4	14.4
	10	skier -- Superman	13.2	18.0
324	1	tree -- tree	00.4	00.4
	2	river -- grass around it -- mail truck	00.8	13.8
	3	sunset -- flowers	00.2	13.8
	4	house -- boat -- table with some- thing on it -- ice tray	00.2	18.0
	5	person -- rocks	00.2	13.8
	6	like the moon -- fork, knife, spoon	00.2	13.8
	7	a person	11.8	11.8
	8	an orange -- fruit -- ash tray	01.8	14.0
	9	spools of thread (SB) -- dishes	17.2	29.0
	10	skier -- Superman	12.8	14.0
325	1	two faces (FG) -- tree -- tree	00.2	09.0
	2	some type of bee -- mail truck	08.0	14.0
	3	praying mantis -- flowers	06.8	14.0
	4	battery -- butter dish (SB) -- no, it isn't a butter dish, either; it's an ice tray	09.2	19.0
	5	globe -- no, it's not a globe, it's an animal -- no, rocks	00.2	14.2
	6	person -- no, flower -- fork, knife, and spoon	04.8	13.8
	7	person -- no, a jar -- yes, a person with something in his hand	09.8	14.0
	8	orange and piece of bread on a table -- ash tray	05.2	14.0
	9	rocks -- marbles -- no, bowls and saucers	11.8	14.0
	10	type of bee -- a plane -- Superman	12.8	13.8

S	SL		(L)	(P)
326	1	two faces (FG) -- two people (FG) -- a tree	02.8	13.8
	2	a flower -- a box of some kind -- mail truck	03.2	13.8
	3	some kind of insect -- flowers -- flowers	06.0	10.8
	4	a building -- a harmonica -- ice tray	02.2	14.0
	5	underwater -- picture of fish -- flower -- rocks	04.2	14.2
	6	diode or transistor -- a bug -- silverware	02.2	14.0
	7	man with pebbles	14.6	14.6
	8	car lights -- field lights -- ash tray	01.0	14.0
	9	dishes	14.2	14.2
	10	a bug -- fishing fly -- Superman	08.6	14.8

Setting 4: Junior College, Degree Credit

S	SL		(L)	(P)
401	1	tree trunk -- that's been split -- heart -- organ in the body -- tree	01.2	11.8
	2	grass upside down -- people standing around water -- mail truck	00.8	14.4
	3	version of a modern house -- baby -- baby -- flowers	00.8	13.6
	4	someplace you'd like to be but never would be -- table with an object on it -- flowers	00.8	19.0
	5	jungle -- person upside down -- person undressed -- flower -- flower -- rocks	00.2	16.8
	6	blood -- rocketship -- insect -- ship -- fork, knife, and spoon	00.6	13.8
	7	KKK emblem -- thing they make horse shoes on (anvil) -- pitcher -- furnace -- man	00.6	11.8
	8	sun and a milder companion -- objects on a table -- food -- ash tray with matches	00.4	11.8
	9	someplace you could lie and feel very peaceful -- water with grass -- two people kissing -- plates, cups and saucers	00.4	14.0
	10	looks like absolutely nothing -- speck of dirt -- a design -- a man -- Superman	07.2	13.0
402	1	anchor type affair -- tree -- tree	04.8	10.2
	2	brown dot -- mail truck	01.8	11.8
	3	bush -- some kind of flowers	10.6	10.8

S	SL		(L)	(P)
402	4	ship -- something floating on water		
		-- an ice tray	04.6	10.8
	5	fish of some sort -- pile of rocks	00.8	14.2
	6	cigarettes -- matches -- knife, fork, and spoon	11.2	14.0
	7	man standing up	10.0	10.0
	8	corn muffins -- piece of butter -- ash tray	07.2	13.6
	9	there we go -- cups, saucers, and glasses	14.4	14.4
	10	looks like Superman	12.8	12.8
403	1	bush -- bush -- tree	05.6	13.8
	2	something with something green on top -- something upside down -- mail truck	04.0	13.8
	3	something orange -- flowers	01.8	13.8
	4	some kind of water scene -- ship -- table with a tray on it -- ice tray	02.2	13.8
	5	something sitting next to a vase -- flower (SB) -- some stones	02.0	25.8
	6	something with white things across it -- maybe sticks -- pens -- knife and fork	10.2	17.6
	7	person in the sunset	10.8	10.8
	8	some fruit sitting on the table -- an ash tray	06.2	12.2
	9	mushrooms (SB) -- plates	09.8	19.0
	10	nothing -- Superman	03.8	12.2
404	1	anchor -- tree -- tree	02.6	08.0
	2	lake -- person -- mail truck	01.8	12.8
	3	sun (FG) -- flowers	02.8	13.4
	4	pad of some sort -- window -- ice tray	06.4	13.4
	5	person -- flower -- bunch of rocks	01.0	14.0
	6	flower -- knife, fork, and spoon	05.2	13.8
	7	chair -- human being	00.2	10.8
	8	horizon -- an ash tray	02.8	11.2
	9	plant -- dishes	03.2	14.0
	10	nothing -- Superman	06.2	13.8
405	1	trees and moss	12.0	12.0
	2	water -- trees. -- mail truck	09.8	14.0
	3	flowers	13.2	13.2
	4	something on a table -- ice cube tray	09.0	11.6
	5	flower -- rocks	11.6	14.0

S	SL		(L)	(P)
405	6	spoon, knife, fork	13.8	13.8
	7	a man	15.0	15.0
	8	ash tray with cigarettes	10.0	10.0
	9	fruit -- fruit -- dishes	07.2	15.8
	10	Superman	13.8	13.8
406	1	tree -- resembling a man -- tree	03.0	09.6
	2	so far just a dark blot -- picture of some sort -- mail truck	03.8	13.8
	3	colored blot -- a rock -- flowers	01.8	12.8
	4	a boat -- ash tray -- ice cubes	01.2	13.2
	5	person -- flower -- rocks	01.0	13.8
	6	colored spot -- pen -- knife, fork, and spoon	03.8	14.0
	7	person -- still a person -- holding marbles	05.2	05.2
	8	a blot -- pillow -- cigarette tray and matches	02.2	13.4
	9	flower -- dishes	10.2	14.0
	10	peony leaves -- Superman	10.4	14.0
407	1	two objects dividing (FG) -- tree	00.2	15.0
	2	green on top -- lake -- someone . . . -- mail delivery truck	00.2	14.0
	3	bright orange -- person -- flowers	00.2	14.2
	4	dish -- ash tray -- tray for ice cubes	01.8	14.0
	5	clamshells -- group of rocks	07.0	14.0
	6	little white blur -- a pin -- knife, fork, and spoon	00.2	14.0
	7	different shades of yellow -- a lamp -- a mixer -- person standing on the beach	00.6	13.0
	8	three objects sitting on a table -- round shape -- ash tray with cigarettes and matches	00.2	13.0
	9	blur -- Kewpie dolls -- dirty dishes in the sink	04.2	14.0
	10	dark shadow -- single object -- bird -- Superman	04.2	13.8
408	1	tree -- tree -- spiderweb -- tree -- tree	06.8	12.8
	2	green grass -- blue lake -- golfers on a field -- mail truck	04.8	13.6
	3	sunset (FG) -- smoke -- flowers	01.4	13.8
	4	house -- window -- window of a house -- ice tray sitting on a counter	07.2	12.2
	5	flower -- some greenery -- cat -- dog -- flower -- stones	00.6	13.8

S	SL		(L)	(P)
408	6	button on a red sweater -- silverware		
		-- silverware on a couch	00.8	13.8
	7	something bright -- picture -- statue		
		-- small statue -- human on beach	00.8	14.0
	8	blue water -- square pillow -- ash		
		tray and book of matches	04.2	12.4
	9	individual sitting down -- dishes in		
		a sink	04.8	13.8
	10	bird in the trees -- a parrot in the		
		trees -- Superman	10.6	14.0
409	1	anchor -- flower -- tree	02.6	09.8
	2	green on top -- flowers -- mailman's		
		wagon	04.8	12.8
	3	person reading a book -- flowers --		
		bouquet of flowers	07.6	12.2
	4	blue sky or water -- tray of ice		
		cubes	00.8	11.6
	5	rocks -- cluster of rocks	13.0	13.0
	6	key -- knife -- utensils	04.8	12.4
	7	lamp -- person -- figure of a person	07.8	10.8
	8	dish -- ash tray with cigarettes	08.8	12.0
	9	lots of colors -- flowers -- flowers		
		-- bowl -- bunch of dishes	03.6	12.8
	10	not many colors -- shadows -- bird		
		-- Superman	03.8	12.8
410	1	anchor -- tree	04.8	11.8
	2	mail truck	13.8	13.8
	3	scene of a house -- clown -- flowers	09.4	13.6
	4	bed -- tray -- ice tray	06.8	12.0
	5	two persons talking -- picture of		
		rocks	02.8	14.0
	6	fork, knife, and spoon	10.8	10.8
	7	cat -- man on the beach	06.4	11.8
	8	telephone -- ash tray	09.2	12.8
	9	seeds -- plants -- pots -- dishes	03.6	13.2
	10	skier -- Superman	13.0	14.0
411	1	branch with leaves on it -- tree	02.6	02.6
	2	bug -- people -- mail truck	06.4	14.0
	3	field of trees -- flowers	09.4	13.0
	4	table with newspaper on it -- pan --		
		ice cube tray	04.2	13.6
	5	flower -- football player -- flower		
		-- bunch of rocks	01.8	13.0
	6	stuff on a table -- knife, fork,		
		spoon	11.8	13.0

S	SL		(L)	(P)
411	7	hammer -- man with stuff in his hand	05.8	12.8
	8	orange -- bowl on a table -- ash tray, matches, cigarettes	05.8	13.0
	9	flower -- shells -- dishes	10.2	12.8
	10	man -- Superman	13.0	14.0
412	1	tree -- tree	00.8	00.8
	2	something green on top -- lines -- car -- mailman's truck	01.4	12.2
	3	something orange -- boat -- flowers	00.2	13.8
	4	cloud -- bridge -- building -- ice cube tray	03.2	13.0
	5	cabbage -- telephone -- rocks	04.6	13.0
	6	pair of dice -- knife, fork, and spoon	03.0	10.6
	7	pitcher -- vase -- man	09.8	12.0
	8	orange -- fruit -- ash tray	03.2	14.0
	9	flowers -- orange, red, blue, yellow -- saucers (SP)	00.2	14.0
	10	U. F. O. -- bird -- Superman	08.0	13.0
413	1	two people talking face to face (FG) -- small anchor -- tree -- tree	01.2	12.0
	2	green -- clouds with black dot -- barrel -- automobile -- mail truck	03.0	15.0
	3	big splotch of orange color -- dark background (FG) -- seaweed -- flowers	03.0	14.0
	4	road on a bright day -- box on a table -- ice cube tray on a table	00.2	13.2
	5	fruit on tree -- pile of rocks	05.0	14.0
	6	sun on a bright morning -- red sky -- object in center -- spoon, knife, and fork	00.2	13.0
	7	two orange colors separating (FG) -- person's hands (FG) -- man on the beach	00.2	14.0
	8	golf ball -- an orange on black and white cloth -- two eggs and a piece of pastry on a table -- ash tray, matches, and cigarettes	00.2	13.0
	9	looking into an aquarium -- shells -- fruit on a table -- cups and saucers	00.2	13.0
	10	haze -- dark spot in center -- bug on a tree -- bird on a tree -- man flying through the air (SP)	00.2	14.0

S	SL		(L)	(P)
414	1	tree -- tree	05.2	05.2
	2	house on a lawn -- people -- mail truck	09.4	13.0
	3	hydrogen explosion -- flowers	01.8	12.8
	4	swimming pool -- ash tray -- ice cube holder	05.8	14.0
	5	bird -- pretty bird -- stones	04.4	14.0
	6	knife, fork, and spoon	10.0	10.0
	7	cross -- teapot -- man	04.0	11.4
	8	two stones -- orange, apple, and other fruit -- ash tray and cigarettes	04.0	13.0
	9	fruit -- dishes	12.0	13.0
	10	clouds -- scissors -- Superman	04.8	14.0
415	1	plant -- flowers -- tree	05.8	13.0
	2	mail truck	13.4	13.4
	3	night-time setting -- flowers	03.0	13.8
	4	piece of paper on a desk -- table with ice cube tray	04.8	12.8
	5	picture of head sideways -- flower -- rocks	03.4	14.0
	6	silverware	13.2	13.2
	7	a coffee pot -- man on the beach	06.8	14.0
	8	still life -- orange -- ash tray and cigarette butts	01.2	12.0
	9	silverware -- dishware	14.0	15.0
	10	bird in flight -- Superman	12.0	13.8
416	1	tree -- tree	10.0	13.6
	2	flowers -- mail truck	09.2	12.4
	3	flowers	12.2	12.2
	4	pool -- ice tray	11.4	13.8
	5	rocks	14.0	14.0
	6	bone -- silverware	06.8	13.0
	7	body -- man on the beach	10.0	13.8
	8	fruit -- ash tray	04.2	13.8
	9	dishes	14.2	14.2
	10	bird -- Superman	12.0	14.0
417	1	tree	17.2	17.2
	2	lake -- greenery in background -- mailman (SP)	03.4	14.0
	3	person's arm -- flowers	12.2	14.0
	4	building -- ice cube tray	09.0	13.8
	5	flower -- Easter eggs -- stones	02.4	14.0
	6	missile in flight -- silverware	05.8	14.2
	7	enlargement of molars (FG) -- a person	07.2	18.0

S	SL		(L)	(P)
417	8	Easter egg nest -- ash tray	10.2	13.8
	9	flower -- mushrooms -- cups and bowls	04.0	13.2
	10	sand dunes -- Superman	07.8	13.8
418	1	anchor -- anchor -- tree	05.8	12.0
	2	flowers -- base lines -- mail truck	07.2	11.2
	3	bird -- tree -- flowers	08.8	14.4
	4	pond -- ice tray	11.0	14.0
	5	bunch of people -- stones	08.2	13.4
	6	windmill -- silverware -- silverware	10.2	14.0
	7	muffins (FG) -- vase -- man on the beach	10.4	14.0
	8	upside down -- golf balls -- cigarettes, matches, and tray	03.6	13.0
	9	golf balls -- teeth -- vases and bowls -- dishes	04.8	13.2
	10	black spot in the middle -- insect -- Superman	06.4	13.6
419	1	branch -- tree -- tree	02.2	03.4
	2	scene outside -- mail truck	09.6	11.8
	3	a lot of colors -- something in center -- flowers	00.8	12.2
	4	very bright -- indoors -- dishes -- pan -- ice tray	02.8	14.0
	5	a lot of objects -- silvery -- design of rocks	03.8	13.8
	6	inside -- studio -- knife, fork, and spoon	03.8	14.2
	7	object in center -- vase -- figure of man on the beach	02.8	11.4
	8	two or three objects -- inside -- ash tray, cigarettes	02.2	12.2
	9	several different objects -- bright reflected light -- dishes	02.8	13.0
	10	one object in center -- neutral back- ground -- Superman	01.0	14.0
420	1	snake -- tree -- river -- flower -- branch -- tree	00.8	13.8
	2	grass -- sky -- colored painting -- persons -- river -- postman (SP)	00.2	12.8
	3	orange -- painting -- object on a table -- person sitting at it -- flowers	02.4	13.8
	4	water -- sky -- portrait -- boat -- pan -- building -- ice tray	00.2	12.8

S	SL		(L)	(P)
420	5	a number of objects -- painting -- flowers -- person -- flowers -- rocks	00.2	13.2
	6	painting -- object -- branch -- animated object -- spoon, knife, and fork	00.6	13.8
	7	tree -- branch -- telephone -- object standing straight up -- table -- machinery -- individual -- person -- diver	00.2	11.2
	8	two bulbs -- sun -- rock -- diode -- eggs -- something on table -- ash tray with matches and cigarettes	00.2	12.2
	9	wildlife -- object on table -- fruit -- pitcher -- dishes in the sink	00.6	12.8
10		space -- infinity -- branch -- flower -- bird -- Superman	04.8	12.8
421	1	tree -- branch -- tree	05.4	12.8
	2	anchor -- beach -- boat -- mailman (SP)	03.6	13.0
	3	sun -- an orange -- sky -- flowers	02.2	13.0
	4	whipped cream -- boat -- table with ice tray	00.8	10.8
	5	bird -- molecule -- flower -- rocks	03.6	14.0
	6	painting -- knife, fork, and spoon	01.2	09.8
	7	tower -- hammer -- person	00.2	07.8
	8	orange -- fruit -- cigarettes, ash tray	01.6	12.8
	9	water -- painting -- fruit -- dirty dishes	00.8	15.8
	10	thorns -- bug -- tree -- Superman	00.8	13.4
422	1	tree -- plant -- tree	00.8	10.8
	2	plant -- lake -- dock on it -- people -- mail truck	00.8	13.6
	3	portrait -- flowers	10.0	13.8
	4	something in the middle -- like a tray -- an ice tray	02.8	13.2
	5	someone's hand -- flowers	11.2	14.0
	6	light in center -- silverware -- silverware	00.6	09.8
	7	a man -- a man	11.4	11.4
	8	ash tray	12.6	12.6
	9	flowers -- dishes	07.8	14.0
10		nothing absolutely -- a bird -- Superman	07.2	14.0

S	SL		(L)	(P)
423	1	X-ray picture of vertebrae -- tree -- tree	01.8	08.4
	2	something reflected in a pool -- person -- people in the background -- trees -- mail truck	00.4	14.0
	3	grayish clouds -- cloudy skies -- flowers	00.2	13.8
	4	white sheet -- something in middle -- like a capsule -- small capsule on a table -- ice tray	00.2	13.8
	5	colors, different colors -- soldier -- rocks	00.2	13.8
	6	something purple -- upside down -- knife, fork, and spoon	00.2	14.8
	7	red and black -- person -- cat -- person with something in his hand	04.6	13.2
	8	two balls -- oranges -- bananas -- ash tray and matches	04.8	13.4
	9	several round blobs -- ear -- dishes	01.8	15.2
10		dark spot in the middle -- red and blue figure -- Superman	05.2	13.8
424	1	something in the center -- plant -- tree	00.8	09.2
	2	ripples on the water -- object in the center -- mailman (SP)	00.2	14.0
	3	orange color -- orange fruit -- flowers	02.4	13.2
	4	rectangular -- a tray -- ice cube tray	08.2	13.0
	5	person bending over -- something round -- reaching -- round clump of rocks	00.8	13.6
	6	smear down center -- something elongated -- knife, fork, and spoon	00.8	13.8
	7	something in the center -- shapeless -- lamp -- pitcher -- person	03.4	12.0
	8	reflection on a lighted object -- square -- bar of soap -- matches and ash tray	02.6	14.0
	9	bright spots -- reflections on bright objects -- apples -- dishes	04.2	14.4
10		something in the center -- skier jumping -- Superman	04.4	10.8
425	1	two cells going apart (FG) -- tree -- tree	01.2	06.8
	2	cell with nucleus -- red and green -- landscape -- mail truck	02.6	12.8

S	SL		(L)	(P)
425	3	female bust (FG) -- bust (FG) -- red colors -- landscape -- flowers	00.8	12.8
	4	ocean -- boat -- car -- station- wagon -- windows -- ash tray -- ice cube tray	02.6	14.2
	5	ear -- colors -- flower -- stones	00.8	13.0
	6	rocket -- rocket in the sky -- knife, fork, and spoon	01.2	13.2
	7	animal (FG) -- two hands (FG) -- two fists with fingers turned away from you (FG) -- man holding something	03.4	14.2
	8	bright clouds -- rocket going off -- firing stage -- ash tray on a table	01.8	12.8
	9	Easter eggs -- some not colored yet -- landscape -- dishes	00.2	14.0
	10	nothing -- something dark in the middle -- butterfly -- Superman	00.8	13.4
426	1	anchor -- bird -- tree -- tree	04.8	10.0
	2	shaggy dog -- mail truck	02.6	11.2
	3	kangaroo -- flowers	07.6	14.0
	4	boat -- bridge -- a pool -- ice cube tray	03.8	14.0
	5	flower -- rocks	04.6	14.6
	6	silverware	13.6	13.6
	7	sewing machine -- man on the beach	09.8	12.8
	8	pottery -- ash tray with matches	06.2	12.6
	9	robin's eggs -- dishes	02.8	14.2
	10	Superman	13.2	13.2
427	1	two faces close together (FG) -- smiling faces (FG) -- people (FG) -- tree	01.8	14.0
	2	man on a park bench -- grass -- mailman (SP)	01.8	13.0
	3	sunset (FG) -- horizon of trees - flowers	00.8	13.6
	4	blue car -- something on a desk -- ice cube tray	01.0	13.6
	5	different color rocks -- formation of rocks	05.2	13.8
	6	pair of pliers -- something metal -- lights -- knife, fork, and spoon	02.6	11.2
	7	a couple of blobs (FG) -- colors separating (FG) -- man standing on a beach	02.2	14.0
	8	an orange -- a fruit display -- pillows -- pillows -- ash tray and cigarettes	01.4	12.8

S	SL		(L)	(P)
427	9	pretty colored room -- person standing in the middle -- Christmas tree ornaments -- plates	01.8	14.6
	10	color -- something dark -- picture -- painting -- Superman	01.2	11.2
428	1	faces (FG) -- tree -- plant -- sea life -- tree	01.0	13.8
	2	dog -- water -- flowers -- car -- tree -- post office man (SP)	00.2	14.6
	3	phone -- someone running -- cat -- flowers	01.6	14.4
	4	flying saucer -- breadbox -- cylinder -- swimming pool -- ice tray	02.0	14.0
	5	lion's head -- doughnut -- necklace -- sky -- rocks	01.4	14.0
	6	earrings -- packet of rice -- netting around it -- spoon, knife, fork	02.6	10.2
	7	gas pump -- weight reducing machine -- person's back -- man -- modern sculpture -- man on the beach	00.6	14.0
	8	an orange -- bread bowl of something -- an ash tray and cigarettes	01.2	12.2
	9	sun shining -- green -- dirty dishes	00.2	14.6
	10	desert -- sand -- sand -- person in the desert -- Superman	01.8	13.6
429	1	person's nose (FG) -- facial expression (FG) -- tree	01.2	13.6
	2	two green dots on top -- group of people -- postal truck	03.8	13.2
	3	orange -- person's nose or cheek (FG) -- caterpillars -- flowers	01.6	13.0
	4	lots of blue -- tranquility -- woman's purse -- ice cube tray	03.8	13.6
	5	trail of a missile -- person bent over -- calisthenics -- rocks	04.2	14.2
	6	red -- bird flying -- bee flying -- spoon, knife, and fork	01.4	10.2
	7	two people kissing (FG) -- person on the beach	04.6	14.8
	8	bright orange -- baby lying on a rug -- pillow -- ash tray	00.6	12.2
	9	blue -- some circles and dots -- dishes	01.2	13.2

S	SL		(L)	(P)
429	10	Sahara desert -- darkness in the center -- Superman	03.8	13.6
430	1	two people with heads together (FG) -- tree -- tree	02.2	07.0
	2	grass on top -- boat -- mailman's truck	04.6	13.0
	3	psychedelic -- yellows and oranges -- flowers	02.8	13.0
	4	house -- trees around it -- car -- ice tray	01.2	11.8
	5	gold fish -- internal organs -- rocks	00.2	14.6
	6	sunset -- fork, knife, and spoon	04.2	15.0
	7	statue -- against sunset -- modern art -- coffee pot -- boy	02.0	12.4
	8	orange on a table -- pear -- cigarette and ash tray	00.2	12.2
	9	sea scene -- underwater -- fishes -- bubbles -- cups and saucers	00.4	14.0
	10	black in the middle -- Superman	06.6	11.8
431	1	X-ray of heart and lungs -- twig coming from the ground -- tree with foliage	00.6	10.2
	2	hazy green water setting -- group of people on land with trees above them -- a street scene -- mail truck	04.4	14.0
	3	psychedelic lights of a band -- two figures seated at a desk -- wrestling -- flowers	02.8	13.8
	4	elaborately printed page -- slot you drop savings in at a bank -- slide rule -- dish with water in it -- ice cube tray	00.8	12.2
	5	someone -- girl in white with green top -- popcorn -- rocks	01.6	13.8
	6	heart operation with light shining on it -- diamond against red background -- jet flying through the air -- bunch of matches -- knife, fork, and spoon	01.4	14.2
	7	a ping-pong paddle -- gold on a gray surface -- cartoon type of figure -- ash tray	02.0	13.6
	8	modern sculpture -- urn -- person -- person on beach with pebbles in his hand	01.8	14.8
	9	doctor's office -- cool, soft colors -- lights -- plants -- peanuts -- bubbles -- dirty dishes	01.6	13.0

S	SL		(L)	(P)
431	10	desert -- one spot like a space ship -- redbird lying on the ground -- Superman	01.0	14.0
432	1	tree -- tree -- tree	01.8	01.8
	2	flowers -- mail truck	11.2	14.0
	3	sunset (FG) -- clouds (FG) -- mask -- flowers	01.6	13.6
	4	water -- reflections -- buildings -- mirror -- pool -- ice tray	01.0	13.8
	5	clothing -- flowers -- color -- light -- football player -- rocks	01.4	12.0
	6	painting -- picture of flowers -- tools -- knife, fork, and spoon	03.6	14.0
	7	a fire -- a silhouette -- a shadow -- a figure -- a man holding something	02.8	13.8
	8	pillows -- sun reflections -- furniture -- ash tray and cigarettes	05.4	13.0
	9	Japanese lantern -- marbles -- shells -- rocks -- dishes	00.8	18.0
	10	outline of square (FG) -- knitting yarn -- Superman	07.6	14.0
433	1	tree	10.6	10.6
	2	room -- something in it -- trees and . . . -- mail truck	03.0	16.0
	3	flowers	14.0	14.0
	4	ocean -- ship on it -- newspaper on a table -- ice tray	02.2	13.4
	5	innards -- Easter eggs -- string -- rocks	06.2	14.0
	6	silverware	14.0	14.0
	7	palm tree -- strange looking vase -- a man	03.6	14.8
	8	two pieces of fruit -- dish -- ash tray	01.8	13.6
	9	Easter eggs -- macaroni -- leaves -- dishes	05.8	13.0
	10	some color -- shapeless shape -- bird -- Superman	04.8	13.6
434	1	tree	06.0	06.0
	2	fields -- house -- mail truck	06.4	13.8
	3	sunset (FG) -- flowers	01.8	12.8
	4	boat -- ice tray	06.8	12.2
	5	man -- flowers -- rocks	01.2	13.6
	6	knife, fork, and spoon -- utensils	12.8	12.8
	7	flower -- man	02.4	13.8

S	SL	(L)	(P)
434	8 fruit -- ash tray	00.6	13.0
	9 people -- flowers -- dishes	01.8	14.6
	10 Superman	10.8	10.8
435	1 branch -- tree	06.8	12.0
	2 upside down -- people standing -- mail truck	03.4	13.6
	3 person's face (FG) -- flowers -- flowers	03.6	12.2
	4 something on a table -- ice cube tray	07.8	12.4
	5 somebody bending down -- flowers -- rocks	04.0	13.2
	6 spoon, knife, and fork	10.8	10.8
	7 bird -- statue of a person -- a person on the beach holding pearls	05.0	14.4
	8 fruit -- ash tray, cigarettes, and matches	02.0	11.8
	9 bunch of food -- dishes	06.2	14.0
	10 something dark in the middle -- insect -- Superman	05.2	13.2
436	1 green tree -- leafy plant -- oak tree -- tree	01.4	10.2
	2 animal head -- postal truck	02.6	14.0
	3 bird in the sunlight -- purse -- flowers	01.6	13.2
	4 document -- something in the middle of a table -- ice tray	01.2	13.0
	5 head of something -- ears -- flower -- rocks	02.2	13.8
	6 bunch of hibiscus (FG) -- two baseball bats -- knife, fork, and spoon	00.8	13.6
	7 statue in the sunlight -- vase -- container -- statue -- person	02.8	16.2
	8 front of a car -- sky back-ground -- ash tray	00.8	10.2
	9 underwater scene -- fish -- rocks -- dishes	00.6	14.2
	10 square painting -- flowers -- Superman	05.8	13.0

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

- Allport, F. H. Theories of perception and the concept of structure. New York: Wiley, 1955.
- Archer, E. J. Concept identification as a function of obviousness of relevant and irrelevant information. In Richard C. Anderson and David P. Ausuble (Eds.) Readings in the psychology of cognition. New York: Holt, Rinehart & Winston, 1965. pp. 454-461.
- Bartley, S. H. Principles of perception. New York: Harper, 1958.
- Berelson, B. and Steiner, G. A. Human behavior: An inventory of scientific findings. New York: Harcourt, Brace & World, 1964.
- Bowden, B. V. (Ed.) Faster than thought. London: Pitman, 1953.
- Bruner, J. S., Goodnow, J. E., and Austin, G. A. A study of thinking. New York: Wiley, 1956.
- Combs, A. W. and Snygg, D. Individual behavior (2nd ed.). New York: Harper, 1959.
- Diach, H. Reading and the psychology of perception. New York: Philosophical Library, 1960.
- DuBois, P. An introduction to psychological statistics. New York: Harper, 1965.
- Epstein, W. Varieties of perceptual learning. New York: McGraw-Hill, 1967.
- Goldfarb, W. Emotional and intellectual consequences of psychologic deprivation in infancy. In E. Hock and J. Zubin, eds., Psychopathology in childhood. New York: Grune and Stratton, 1955. pp. 105-119.
- Guilford, J. P. The nature of human intelligence. New York: McGraw-Hill, 1967.

- Harrington, M. The other America. New York: Macmillan, 1952.
- Hebb, D. O. The organization of behavior. New York: Wiley, 1949.
- Hochberg, J. E. Perception. Englewood Cliffs: Prentice-Hall, 1964.
- Hubel, D. H. The visual cortex of the brain. In Psychobiology: The biological bases of behavior. Readings from Scientific American. San Francisco: Freeman, 1967. Reprint from November, 1963.
- Hunt, J. McV. Intelligence and experience. New York: Ronald Press, 1961.
- Ittleson, W. H. Perception, a transactional approach. Garden City, New York: Doubleday, 1954.
- Ittleson, W. H. Visual space perception. New York: Springer, 1960.
- Katz, B. How cells communicate. In Psychobiology: The biological bases of behavior. Readings from Scientific American. San Francisco: Freeman, 1967. Reprint from September, 1961.
- Kelley, E. C. Education for what is real. New York: Harper, 1947.
- Koffka, K. Principles of gestalt psychology. New York: Harcourt, 1935.
- Lecky P. Self-consistency, a theory of personality. New York: Island Press, 1945.
- Lewin, K. A dynamic theory of personality. New York: McGraw-Hill, 1935.
- Miller, G., Galanter, E., and Pribram, K. H. Plans and the structure of behavior. New York: Holt, Rinehart & Winston, 1960.
- Mills C. W. The sociological imagination (2nd ed.). New York: Grove, 1961.
- Mowrer, O. H. Learning theory and behavior. New York: Wiley, 1960.

- Newell, A., Simon, A. and Shaw, J. C. Elements of a theory of human problem solving. In Richard C. Anderson and David P. Ausubel (Eds.) Readings in the psychology of cognition. New York: Holt, Rinehart and Winston, 1965. pp. 133-157.
- Osler, S. and Cooke, R. E. (Eds.) Biosocial basis of mental retardation. Baltimore: Johns Hopkins, 1965.
- Penfield, W. Functional localization in temporal and deep sylvian areas. In The brain and human behavior. Baltimore: Williams & Wilkins, 1954. pp. 210-226.
- Piaget, J. The language and thought of the child (Transl.). New York: Harcourt, Brace, 1926.
- Piaget, J. and Inhelder, B. The growth of logical thinking from childhood to adolescence (Transl.). New York: Basic Books, 1958.
- Piaget, J. Psychology of intelligence (Transl.). New York: Littlefield, Adams, 1960.
- Ryle, G. The concept of mind. London: Hutchinson, 1949.
- Sherrington, C. S. The integrative action of the nervous system. New Haven: Yale University Press, 1906.
- Schultz, D. P. Sensory restriction: Effects on behavior. New York: Academic Press, 1965.
- Skinner, B. F. Verbal behavior. New York: Appleton, Century, Crofts, 1957.
- Smith, K. U. Cybernetic theory and analysis of learning. In Edward A. Bilodeau (Ed.). The acquisition of skill. New York: Academic Press, 1966. pp. 425-478.
- Soltis, J. F. Seeing, knowing, and believing: A study of the language of visual perception. Reading, Massachusetts: Addison-Wesley, 1966.
- Sokolov, E. N. Perception and the conditioned reflex (Transl.). New York: Pergamon, 1963.
- Straus, E. The primary world of senses (Transl.). New York: Free Press of Glencoe, 1963.
- Thurstone, L. L. A factorial study of perception. Chicago: University of Chicago Press, 1944.
- Wertheimer, M. Productive thinking. New York: Harper, 1952.

- Wiener, N. The human use of human beings; cybernetics and society (Rev. ed.). Garden City, New York: Doubleday, 1954.
- Wiener, N. Cybernetics; or control and communication in the animal and the machine (2nd ed.). New York: MIT Press, 1964.
- Witkin, H. A., et al. Personality through perception: An experimental and clinical study. New York: Harper, 1954.
- Wooldridge, D. E. The machinery of the brain. New York: McGraw-Hill, 1963.

Periodicals

- Adler, M. J. Some educational implications of the theories of Jean Piaget and J. S. Bruner. Can. ed. Res. Dig. 1965, 5:5-13.
- Archer, E. J. Identification of visual patterns as a function of information load. J. exp. Psychol., 1954, 48:313-317.
- Boger, J. H. An experimental study of the effects of perceptual training on group IQ test scores of elementary pupils in rural ungraded schools. J. educ. Res., 1952, 46:43-52.
- Bruner, J. S. On perceptual readiness. Psychol. Rev., 1957, 64:123-152.
- Bruner, J. S. and Goodman, C. C. Value and need as organizing factors in perception. J. abnorm. soc. Psychol., 1947, 42:33-44.
- Bruner, J. S. and Potter, M. C. Interference in visual recognition. Science, 1964, 144:424-425.
- Carey, J. E. and Gross, A. E. The role of verbal labeling in the conceptual sorting behavior of children. J. genet. Psychol., 1957, 90:69-74.
- Engel, E. The role of content in binocular resolution. Amer. J. Psychol., 1956, 69:87-91.
- Getzels, J. W. and Elkins, K. Perceptual and cognitive development; perception in space and perception of form. Rev. educ. Res., 1964, 34:559-563.

- Harlow, H. F. The formation of learning sets. Psychol. Rev., 1949, 56:51-65.
- Pastore, N. Perception's issues: In terms of intrinsic properties of the nervous system. J. gent. Psychol., 1960, 96:93-99.
- Pavlov, I. P. The scientific investigation of the psychical faculties or processes in the higher animals. Science, 1906, 24:613-619.
- Piaget, J. Structures operationnelles et cybernetique. Annee Psychol., 1953, 53:379-388.
- Riesen, A. H. The development of perception in man and chimpanzee. Science, 1947, 106:107-108.
- Schiller, P. H. Innate constituents of complex responses in primates. Psychol. Rev., 1952, 59:177-191.
- Smith, K. U. The nature of optokinetic reactions in mammals and their significance in the experimental analysis of the neural mechanisms of visual functions. Psychol. Bull. No. 35, 1938, 193-219.
- Spitz, R. Anaclitic depression. In Psychoanalytic study of the child. Vol. 2. New York: International Universities Press, 1946.
- Tolman, E. C. Cognitive maps in rats and men. Psychol. Rev., 1948, 55:189-208.
- Weil, A. T. Harvard's Bruner and his yeasty ideas. Harper's Mag., 1964, 55:189-208.
- Wesley, E. L. Perseverative behavior in a concept formation task as a function of anxiety and rigidity. J. abnorm. soc. Psychol., 1953, 48:129-134.

Dissertations

- Frymier, J. R. The relationship of certain behavioral characteristics to perception. Ed. D. dissertation. University of Florida, 1957.
- Ward, T. The experimental testing of a concept of perception with implications for music education. Ed. D. dissertation, University of Florida, 1956.

BIOGRAPHICAL SKETCH

Corinne Regina O'Brien was born on September 9, 1922, at Baltimore, Maryland. She was graduated from Academy of the Sacred Hearts in Fall River, Massachusetts, in 1940, and received a Bachelor of Arts degree from Immaculata College, Immaculata, Pennsylvania, in 1944.

She attended Sacred Heart Normal School in Fall River in 1945 to prepare for a career in teaching. Her early classroom experience was as a member of the Religious of the Holy Union with whom she taught in Fall River and Taunton, Massachusetts, until 1952 when she relocated in Tampa, Florida, and married. She was employed as a legal secretary and as a real estate broker-salesman until 1960 when she returned to the classroom.

She received the degree of Master of Arts in Education at the University of Florida in 1963. During the following year, she was a member of the Guidance and Counseling Institute at the University of Florida, and in 1966-1967, a Graduate Fellow at the same institution.

She is a member of Kappa Delta Pi, American Personnel and Guidance Association, National Education Association, and various professional groups.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Education and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

B. Sharp & M. C. Baker
Dean, College of Education

Dean, Graduate School

Supervisory Committee:

Myron Cunningham
Chairman

T. A. Hines

Audrey Schumacher

James L. Lister

O. A. Cate